THE AMERICAN JOURNAL *of* PSYCHIATRY

VOLUME 116
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1. *Ferrand, P. T.: Minnesota Med. 41:853 (Dec.) 1958.*

2. *Edisen, C. B., and Samuels, A. S.: A.M.A. Arch. Neurol. & Psychiat. 80:481 (Oct.) 1958.*

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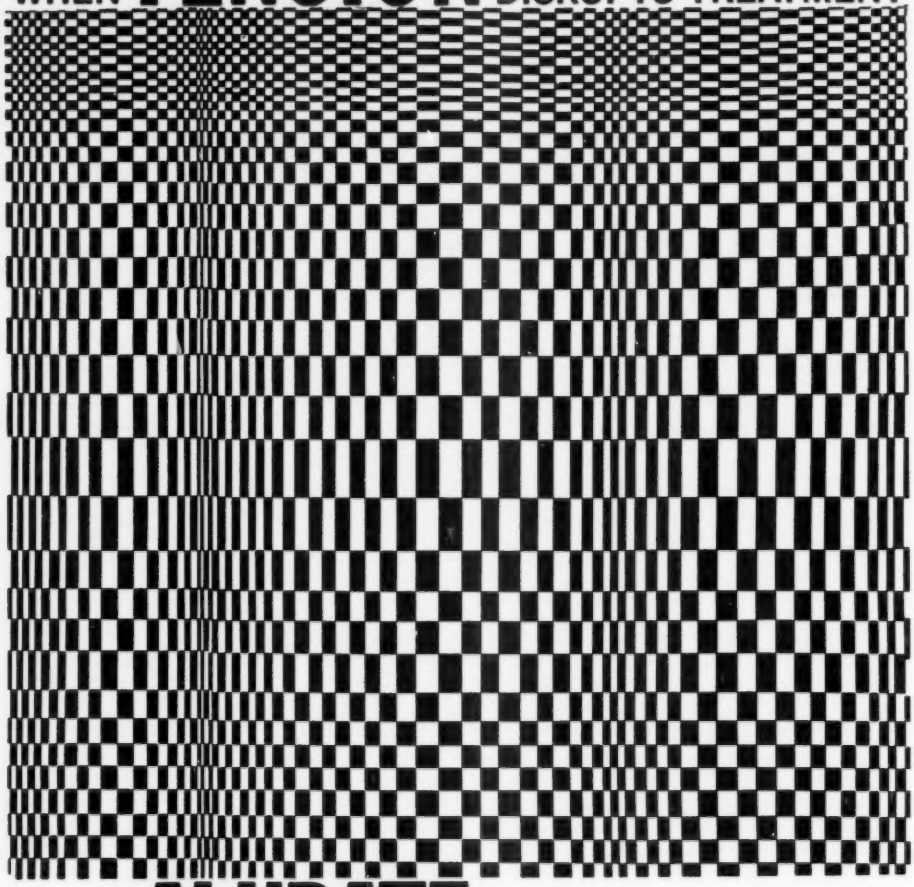

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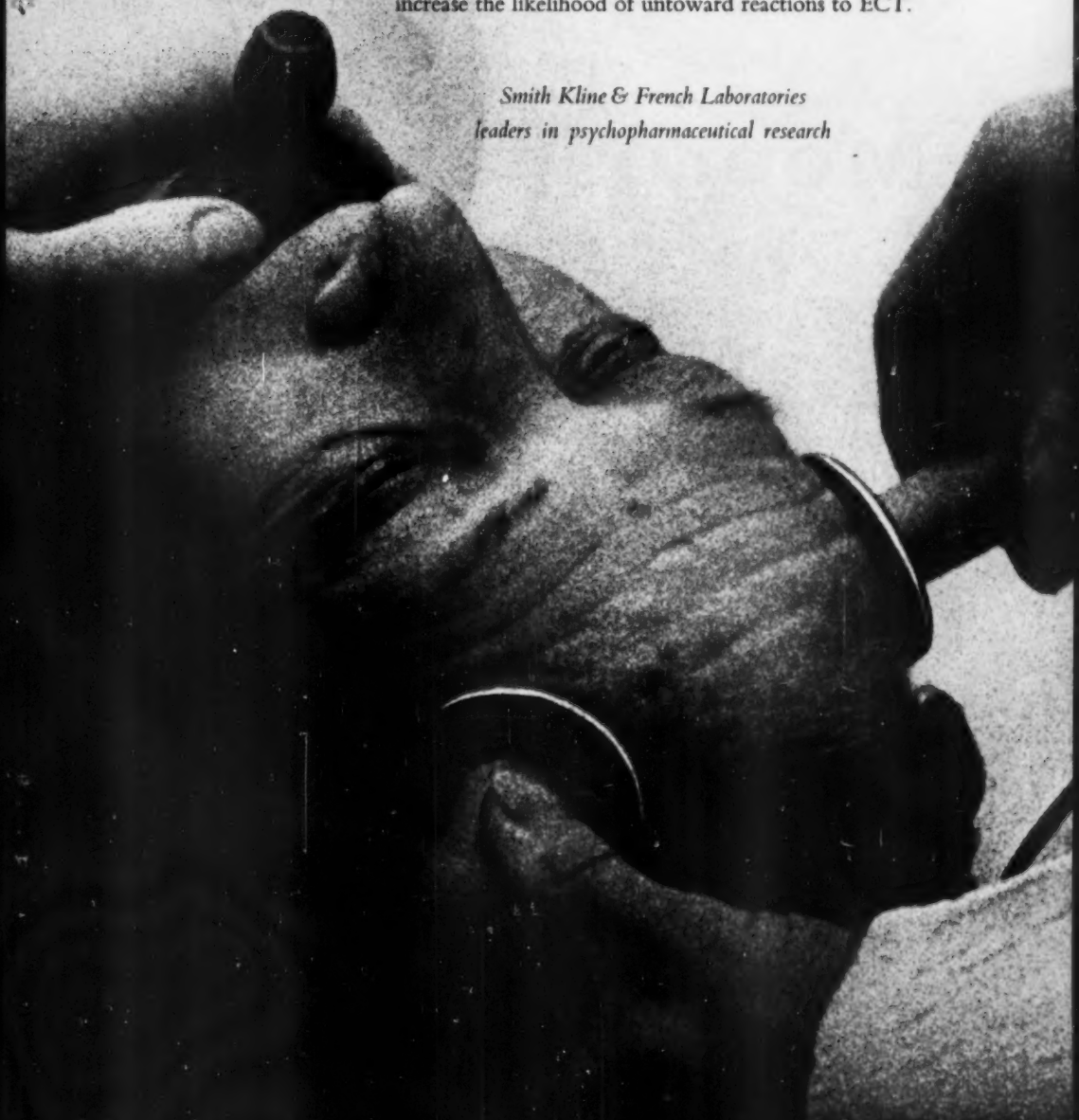

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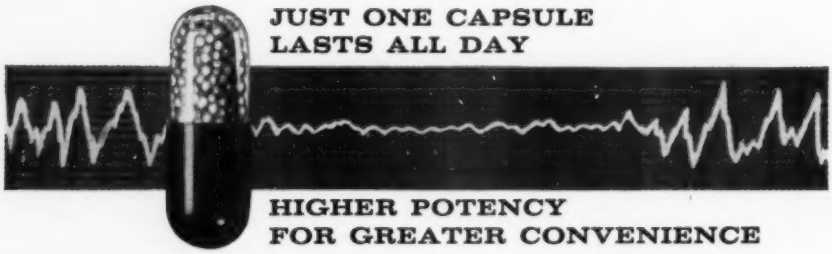

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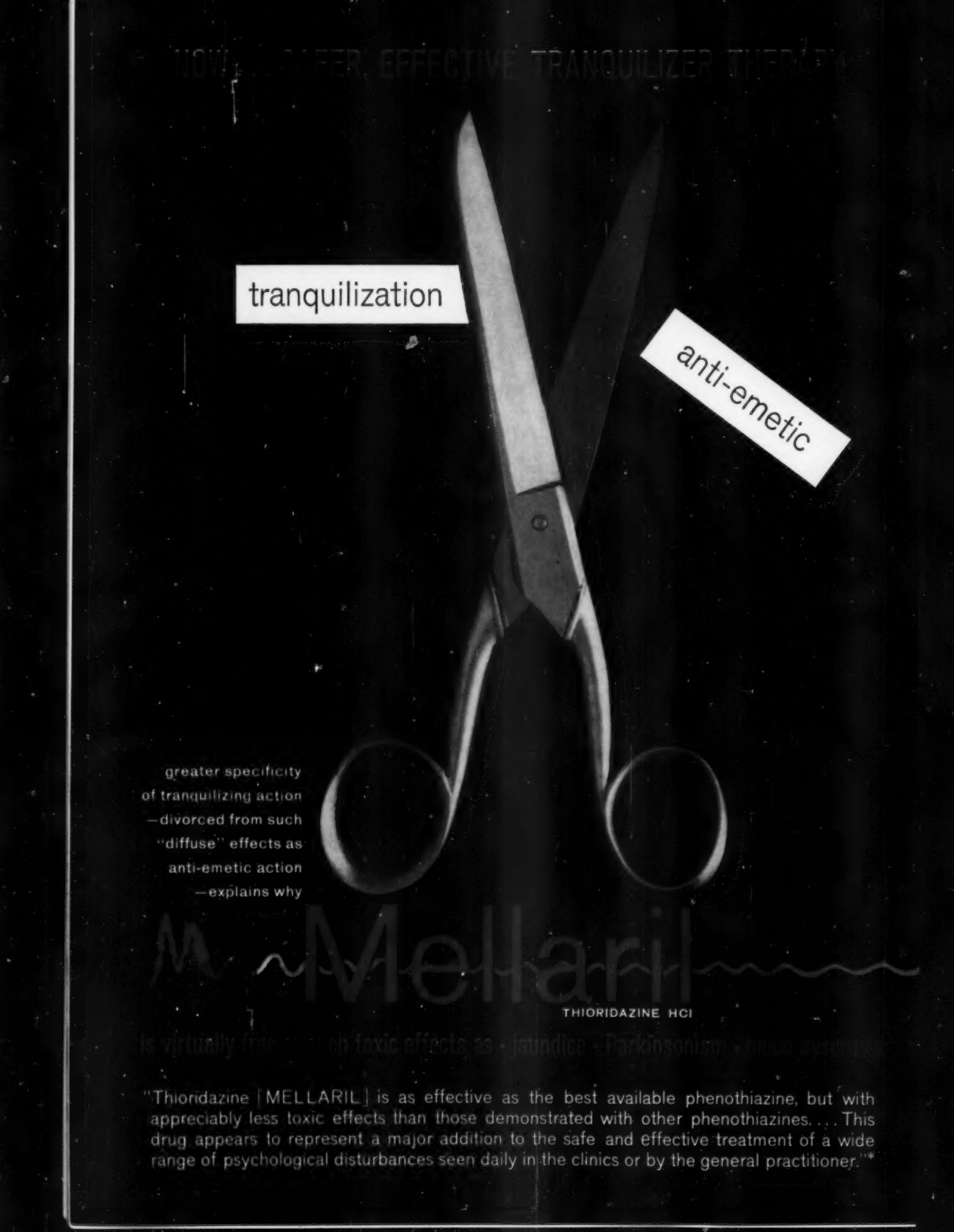

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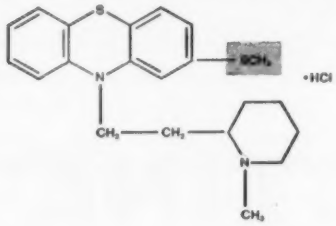

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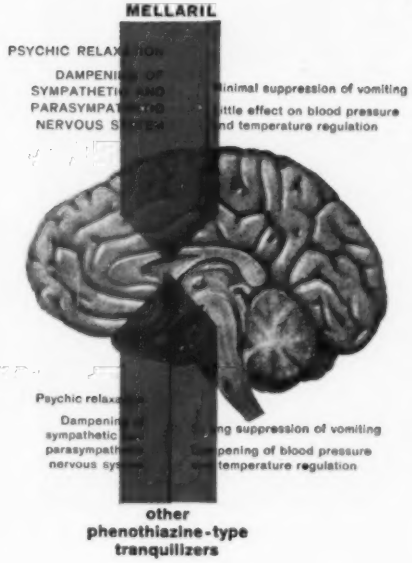

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RHEUMATOID ARTHRITIS (Adjunctive Therapy—in severely disabling forms, particularly when accompanied by depression): 9 to 12 mg. daily for 3 days, then 6 mg. daily, reducing further to 3 mg. daily on signs of improvement. If a conventional antiarthritic agent is used, lower doses of each are indicated.

CAUTION: Certain circumstances should be watched carefully when using CATRON.

DRUG POTENTIATION—The list of drugs which CATRON potentiates is not yet complete. Hence, caution should be exercised when combining CATRON with any other drugs such as tranquilizers, phenothiazines, the amphetamines, barbiturates, and hypotensive agents.

HYPOTENSIVE EFFECT—All normotensive patients receiving CATRON, but especially elderly patients, should be warned about the possibility of orthostatic hypotension during the initial period of higher dosage. In the few instances where this may occur, lowering of the dose will usually permit continuation of therapy.

VISUAL DISTURBANCES—A reversible red-green color defect has been reported in a few patients, chiefly hypertensives, on extended therapy with CATRON. Discontinue the drug if such changes occur. In a few instances, at unusually high dosage, or where the drug was not discontinued following color disturbances, diminished visual acuity occurred.

ANIMALS, NEUROLOGIC SIGNS—In toxicity studies with animals a neurologic syndrome has been observed, characterized by tremors, muscle rigidity and difficulty in locomotion. Animals displaying this visible neurologic syndrome after prolonged **parenteral** administration usually disclosed a neurologic lesion at autopsy. In other animals these visible neurologic symptoms disappeared following cessation of the drug. No lesions were found after oral administration. Although extensive clinical experience has not shown such reactions to be a problem in humans in recommended dosage, should a similar neurologic disturbance occur, the possibility of drug action should be considered.

SIDE EFFECTS—Major side effects requiring cessation of therapy are infrequent. Other side effects—constipation, delay in starting micturition, increased sweating, hyperreflexia, ankle edema, blurring of vision, dryness of the mouth—are usually readily controlled by lowering the dosage. Rash, observed in a few patients, cleared up rapidly upon discontinuing therapy.

WARNING: Although pharmacologic evidence indicates that CATRON has a selectivity for the brain, it, as well as other monoamine oxidase inhibitors, may be associated with hepatitis. Because of the possibility of this life-threatening hepatitis, the following recommendations and precautions should be observed. If necessary, the patient should be hospitalized to expedite adherence to this regimen.

The Following Precautions Are Recommended:

1. In all instances daily dose should not exceed 12 mg.
2. Reduce daily dose as soon as response is established, usually in a matter of 1 to 2 weeks.
3. Do not prescribe to a patient more than sixteen 6 mg. tablets or thirty-two 3 mg. tablets of CATRON at one time.
4. Patient should return for observation before additional CATRON is prescribed. For this reason, prescriptions for CATRON should be marked "Not refillable."
5. Perform regular liver function tests.
6. Do not use the drug in patients with a history of viral hepatitis or other liver abnormalities.

SUPPLIED: CATRON is the original brand of pheniprazine hydrochloride. It is supplied in tablets of 3 mg. and 6 mg., bottles of 50.

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ADOLF MEYER RESEARCH LECTURE

WHERE VITAL THINGS HAPPEN [1]

W. GREY WALTER, Sc.D.[2]

The great honor of delivering this lecture is a very personal one, since Meyer was one of the first to recognise that physiology must itself evolve in order to encompass the problems of mentality, and so I may dare to assume that you as psychiatrists consider my particular brand of physiology sufficiently advanced to meet the exacting requirements laid down a generation ago by the man whose name we honor today.

The title for this lecture is taken from a passage in a paper by Adolf Meyer on the scope and teaching of psychobiology(3).

All the writings of Adolf Meyer are so full of scholarship, so well informed, so original, so passionately sincere—and so up-to-date that I could easily fob you off with a series of quotations from them—it is hard to find any subject related to mental activity and brain function that is not dealt with in some part of Meyer's work. The particular passage from which I have taken my title is concerned with the integration of mental function and if you will permit me to quote further extracts, these will outline vividly for us the scope and purpose of this lecture.

> We must establish the habit of scrutinising the facts and factors . . . It is certainly not mere physiology. It is . . . thought of in settings for which physiology does not have any terms and for which it does not cultivate adequate terms . . . This requires experience with both facts and methods and this requires superfine practice and not mere "thinking" and reading and talking. Yet it is just this kind of functioning which we may have to review . . . *We must turn to where vital things happen, where they have their beginnings and developments. And this is not so simple . . .*

I find some cause for pride and comfort too in sharing with Meyer a mixture of European and American influences. Although our work paths moved in opposite directions, our cultural plans are similar. Like Meyer I have genetic roots in Switzerland and educational origins in the Mid-West—though I have the additional advantage of having been born in the heart of America. Like him too I have a great distrust for the tyranny of words and I echo with feeling his expostulation "When it comes to psychobiology, I wish it were possible to get rid of the words and get the sense to unprejudiced readers." I support with enthusiasm his exhortation "It is always wisest to pay attention to the whole range of factors" but like him I can see very clearly the colossal difficulties that anyone who tries to see men steady and see them whole must overcome. Endeavors in this field are not likely to attain the critical mass for an explosion into front page glamour, nor can we easily attract by horror by "nostalgie de la boue," those who have committed themselves irrevocably to what Meyer dismisses as "The imagined cesspool of the Unconscious."

Perhaps the most encouraging and reassuring acknowledgment is the sentence found in one of Meyer's diaries, which I can repeat with calm assurance—"I am glad that I have decided to study the whole of Man."

During the 14 years that have passed since the end of World War II, psychobiology has developed beyond the hopes and expectations of the early pioneers. As always we must acknowledge the powerful and perpetual stimulus provided by the technological advances evoked in military emergency. Equipment which we now consider conventional and basic would have been a crazy dream 20 years ago. With the

[1] Read at the 115th annual meeting of The American Psychiatric Association, Philadelphia, Pa., Apr. 27-May 1, 1959.

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elaboration of apparatus has gone a vast multiplication of research centers and specialised techniques. At the outbreak of war in Europe there were perhaps half a dozen tiny nuclei of psychobiological research, scarcely worthy of the name laboratory. Now there are hundreds scattered all over the world, some concerned mainly with the strictly clinical and urgent necessities of diagnosis and treatment, others entangled more subtly with the delicate problems of individual behavior and social relations envisaged by Meyer, never before so clearly defined and so tantalisingly near solution.

As Meyer knew, this is certainly not mere physiology; neither our training nor our inclinations have fitted us for this task, and we know that we are entering a new domain with no credentials or passport other than an insatiable hunger for self-knowledge and a limited capacity for self-discipline. The physiological laws on which we were nurtured do not run in this realm where the individual is king, since they ignore idiosyncrasy. Nor can we rely on the statistical conventions with which we have tried to overlay the doctrinal barriers between our disciplines, for these too are better adapted to the effacement of individual variations than to their clarification. What is the source of these difficulties? Why have our physiological excursions into the domain of mentality been so crudely empirical or at the best intuitive and inductive? At the present time there is still not one single principle of mental physiology that can claim the status of a natural law, in the sense that it receives universal acceptance and permits deductive prediction or extrapolation.

The main theoretical difficulty is that the classical methods of scientific study, inherited by physiologists from their intellectual forbears in the basic sciences, depend on the isolation of a single variable in large-scale simple systems, or, in the special case of contemporary physics, the unidentifiable elements in complex micro-systems. Neither of these methods is directly applicable to the problems encountered in psychobiology, which deal with large-scale complex systems of heterogeneous elements, interacting freely with one another through probabilistic links, the vast majority of which are quite inaccessible even to the most delicate probe. Human brains are, in the terms used by theoretical physicists "immense systems" and it is doubtful whether there are enough of them to permit generalisation. This may sound absurd—there are over 2,000 million human beings around us and surely, we may say, this constitutes a large enough population to yield a suitable sample. But this is not necessarily so. Let us consider the sort of system we are dealing with. You may have recognised the definition in the preceeding paragraph "complex systems of heterogeneous elements interacting freely with one another through probabilistic links" as applying to human nervous systems—it also applies of course to human societies. But what do we mean by complex, and what is the order of complexity? Anatomists tell us—and in this case we may believe them though their data are from material they describe euphemistically as "fixed"—that there are at least 10,000 million neurones in our brains. This is not really a very large number by cytological standards—less than the number of red cells in our blood stream—but what we have to consider is that these elements are interconnected in various ways. The cells in our blood or skin, even in the other great internal organs, are working essentially in parallel, one may say: they are not in any useful sense a community. The relations between the cellular elements in other organs depend only on two factors, contiguity and atmosphere, that is the nature of the fluids that nourish or control them. All cells have a climate and some degree of neighborliness, some participate in a serial fashion in functions such as movement or digestion, but only in the central nervous system do we find the texture of interlaced channels of communication that merits the term *complexity*.

The effect of this inter-connectedness can be estimated numerically, with some reserve on the grounds of our ignorance, but with enough confidence to illustrate the scale of the psychobiological problem. Starting with a complex system containing only two elements and allowing only the minimal degree of structuring and quali-

tative scope, we find that already we have to consider 7 possible modes of behavior or dynamic states. Perhaps it is worth repeating an illustration I have given before of what this means in practical terms. Suppose that our two elements are not neurones in a nervous system but human beings, say a man and his wife forming a household and that we play the role not of impersonal physiologist but of crafty burglar. Before we make our entry to this little system we must "case the joint" to see what possibilities exist. We shall note the following modes of existence in the household; the zero mode O—when both husband and wife are asleep, mode A when the husband is at home alone, B—the wife alone; A, B—both at home but isolated from one another, A→B—both at home with the husband addressing his wife, A←B—the same but (some would say more probably) with the wife addressing the husband, and finally A⇄B—the same but with the couple in mutual converse. As a criminal objective we would recognise the first and last modes as most promising for our purposes. In the other modes either or both human elements would be attentive to outside stimuli, but in sleep—or death—and when preoccupied with each other, the two element systems cannot attend to external matters. Note that this variety of modes is established without recourse to external intervention. If we introduce this the difficulties increase very rapidly, as for example, when both elements are distracted by a common external stimulus (watching television is the obvious analogy). In these circumstances again we may plan an unobtrusive entry.

This little allegory may seem far-fetched to some of you, trite and trivial to others, but I think it is worth spelling out what we mean by complexity because it is a word that is often used casually and sometimes as a pretext for defeatism in psychobiology. The important point is that the complexity of our neural and social apparatus can be estimated, so that, having appreciated the situation in terms of the strength of the opposing forces, we can more confidently plan our strategy and tactics for a better co-ordinated and more economical assault.

Clearly, we shall be wasting our time if we try to attack such problems by a simple multiplication of conventional weapons. Our losses in treasure and morale would be too high and we should give away our own position completely. This is a very serious problem in the design of experiments, the interaction between observer and observed, and it is particularly insidious in situations where organisms attempt to study others of the same species—as psychiatrists know so well. The techniques of psychoanalysis have been criticised and ridiculed on many occasions and we must all admit that certain aspects of them are open to ribald and satirical caricature. None the less the detachment and apparent indifference of the analyst, his patience and carefully cultivated impersonality, which so enrage or discourage some patients, are derived from the laboratory rather than the clinic, and are to be commended by all who claim a scientific education in detachment, patience, humility and serendipity.

In more sophisticated and modish terms, how are we to ensure that information flows from the complex system under scrutiny—the human being—to the observer, the clinician or scientist and not in the reverse direction? As I have said, you as clinical psychiatrists achieve this by experience and endurance. Your experience of patients tells you more about the likely behavior of patients than your patients will know of the behavior of psychiatrists. You have real case histories, they have only the comic strips and the public library. Your endurance ensures that you will outlast the longest silence and appreciate the most frivolous chatter. As well as these Fabian tactics you also have in reserve a variety of physical stratagems to soften up the taciturn and quell the garrulous. And all the time you can observe the subtle display of bodily changes, the gestures, fidgeting, sighs and changes of color that provide the trained clinician with a running commentary on his patient's state of mind and feeling. In all this, your clinical art, you have a sort of information valve, a one way rectifying and amplifying device that should bring you some understanding even if it does not always give you the power to

control or heal. And above all, you retain appreciation for the individual—you may sometimes think something like "this is typical of an endogenous depression" but more often you say "this is how *this* patient shows that he is depressed."

Now at last in our experimental work we are trying to emulate these faculties of yours, but we have some difficulties that you have not, and some resources which you could not use. Where you communicate mainly through language with all the ambiguities and romantic overtones that this implies, we try as well to include in our survey the patterns of electrical change within the brain. Furthermore, accepting the importance and validity of the unrehearsed and uncontrollable activities of the autonomic nervous system, we take pains to record and correlate with all the other information the changes in heart and lungs, skin and blood vessels, eyes and muscles that reflect, albeit obliquely, the swirling tides of passion so well contained and disciplined by the well-drilled supervision of the neo-cortical networks.

As you know, this mechanisation of our scientific armament has involved the deployment of heavy pieces of technical artillery. This apparatus again is, in effect, an amplifying valve to direct and concentrate the flow of information from subject to observer, but the interaction problem becomes even more subtle and serious. We cannot conceal our strength by discreet withdrawal out of view; our subjects are constrained by manifold appliances which we make as inconspicuous as possible, but they are still obtrusive. So, whether we like it or not, our subjects gain some information from us, and we counter by certain mild deceits which in the military tradition divert attention from essential manoeuvres to trivial ones.

In the early phases of these researches, we and most other investigators, with echoes of our statistical courses ringing in our ears, attempted to reduce or systematise the immense amount of objective data we amassed by conventional procedures, but as I have already affirmed, this is a vain exercise. There is no more justification for say, computing the average frequency of a brain rhythm than there is for counting the syllables in a patient's verbal complaint. As in recognising speech, it is the pattern and cadence that we must attend to rather than the elementary numerical features. This is easily said, but to achieve it we must discard many of our most trusted tools, go back to school, learn new tricks, sit meekly at the feet of the great clinical scientists who can still detect the patterns of variation, the syndromes of pathology that enrich the palette and guide the brush of the clinical artist.

For, though our concern is mainly with our normal fellow beings, the attitude we have to adopt is essentially a clinical one, even if the signs and symptoms are filtered through miles of wire and paper and displayed as lifeless figures and graphs. This is not to say that we choose to ignore the qualitative human factors in favor of the objective readings of our instruments; on the contrary our task is to relate the two classes of observation in such a way as to confer depth and perspective without freezing the picture into a meaningless and inexpressive pose. It is in this composition, framed in the regularity of science but with all the gentleness and variety of human feeling that we must try to find where it is that vital things have their beginning and their development.

We can be sure that Meyer chose this word "vital" deliberately for its double meaning; the things that concern us are both important and lively—but what, for our purposes, is important and what is life? Not all important things are alive and not all living things are important—or are they?

We must select some aspects of living things for their importance and we must be sure that they are important in more than a local, temporary and eccentric way. The history of science is littered with the relics of "important" ideas and "facts" that later generations discarded as superstition and illusion. So often too we are misled by technical virtuosity or verbal fluency. Have we not all spent months of our professional life struggling with scientific rhetoric or groping among instrumental cobwebs? Perhaps in another generation or so our mathematical colleagues will come to our aid with new, more comprehensive and comprehensible algebras that can express our

ideas and condense our observations without straining too much our already stressed understanding.

At the present time I think we have only one way of dodging between the glorious earthy ambiguities of the vernacular and the serene unintelligible abstractions of mathematics—to crystallise our ideas into working models, material analogues clean shaven by Occam's razor, clear, simple, unequivocal and like crystals, brittle, so that when our hypotheses break down as they always will, they shear with a clean snap and do not yield and flow as words and phrases do. Some of you have seen examples of what I mean by working models and many of my colleagues now feel as I do, that this is the only trustworthy channel of communication between the allies in this no man's land of science. If these devices seem only frivolous to you, then look and listen more closely; like telegraph operators in an idle moment we sometimes indulge in friendly chatter to keep the line alive—we all enjoy a gossip and a family joke. But in between the puns and jingles you will find messages of the most serious and strategic import. What are these messages and what action do they demand?

Without going into laborious detail, I can outline quite briefly the ways in which study of artificial animals has helped to direct our attention to truly vital things. First, we can distinguish and define more clearly those aspects of behavior that are specifically in the vital class. It is not so long since such phenomena, as goal-seeking behavior, self-regulation and self-repair, appreciation of optima, logical decision, free choice between equiprobable objectives, the identification of self, the development of personality, the formation of co-operative communities, modification of behavior by experience, and so forth were assumed to be uniquely the attributes of living creatures. But now all these and much besides are known to be imitable by artificial creatures. Indeed some of these functions are performed far more accurately and consistently by artefacts than by animals or men. In some cases, for example, the regulation of complex processes, arithmetic, logical analysis, are now delegated almost exclusively to non-living contrivances; in others the demonstration of mechanical competence is on a model scale. If no one has conceived a machine like a man, it is because the human market is already saturated and the conventional means of production satisfy other needs at the same time.

These practical developments and the theoretical inferences from them may seem to lead to the conclusion that no important differences are to be found between living and non-living systems. But this is not so; what seems to be nearer the truth is that there is a continuum or spectrum of intricacy, with our simplest contrivances in a class at one end and ourselves and any superior beings in another class at the other. Between these extremes there are imperceptible gradations of liveliness; at the lower end it would not be worth living and the higher end would not be worth imitating. Is this gradation merely one of scale, or are there fundamental differences of quality between the extremes? Scale differences there certainly are; the simplest creatures in flesh or metal are also the smallest, the commonest, the most easily imitated. We human beings and our more elaborate domesticated machines are in comparison large, rare and expensive. But this is not an adequate scale; the largest animal is a basically very simple jelly-fish with a very limited repertoire of behavior patterns, and some quite tiny missiles have a very delicate sensibility for worth-while targets. We cannot overlook, even in the metal, certain powers that are more than algebraic. There are several modern thinkers—and experimentalists—as well as the majority of the ancients, who have felt that these peculiar properties of what we may call immensely complex systems justify the enunciation of special principles, distinct from and perhaps transcending, the laws that permit us to explain and predict the behavior or simpler systems. One of the most distinguished of those recently involved in this dispute is Elsasser(2). This is a very solemn decision to make—we dare not join the ranks of the vitalists unless we are prepared to surrender all our scientific freedoms, and we must consider this challenge seriously. What are the special

powers that make some living things such as ourselves so intractable to physical law? The first that should occur to us is reproduction. This is not the theme of my discourse and we may put it on one side for meditation, but I should like to remind you that organic reproduction is not necessarily replication, and the more complex the system the less perfect the copy of design from one generation to another. Animal breeders would be very happy if this were suddenly not so; they could specify a champion from sire and dam, but if it were not so they would never have had the opportunity to breed the champion stock at all. Charles Darwin, a century ago, was very much concerned with *variation* in the origin of the species and this uncertainty of reproduction seems rather to have been neglected by those who find the process inexplicable in physical terms. The information transmitted from generation to generation is vast indeed, but highly corruptible—by no means every mating is fertile and many even of our own progeny are monstrous. In the fertile union of human gametes there is embodied only a high probability of human issue—even the sex of the newcomer is just a little blurred, not sharp and exclusive as was once supposed.

I have mentioned this problem only to dismiss it, but in the hope that it may serve to introduce in an obviously relevant and verifiable context the notions of probability and variety which are of paramount importance in the next subject we must consider, the central and practical theme of this lecture, that bundle of concepts and speculations that we may enfold in the terms Learning, Memory, Motivation, Imagination, Originality and Personality.

This is dangerous ground, but we must cross it to reach a firm basis of mutual understanding; so as a physiologist, I choose to rush in where even some philosophers have feared to tread. We have already considered the special complexity of the system we are attacking and the weakness of our traditional tactics. What can we bring up in support? Our first step must be to find out what we can observe and measure and then see how our observations can be welded into some sort of coherent theory or hypothesis. The first process is sometimes referred to as the Identification of Operational Parameters. What operational parameters can psychobiological research establish by experiment and analysis, and how do these relate to the concepts, abstract or empirical, derived from other sources?

I have described elsewhere the ways in which we have tried to systematise our observations of changes in human brains and bodies during experimental tests of function; we have suggested that the following parameters could be used to classify and correlate such data; Versatility, Imagery, Stability and Ductility. Let us consider some of these. Versatility was chosen as a term to indicate the extent of variation in an organism's behavior, the repertoire of response patterns in a given situation as compared with the repertoire of other individuals. This notion was derived from experimental studies of brain activity and behavior of normal people performing tasks which in effect challenged their powers of understanding and control but left them free to gain control in any way they pleased. The objective evidence of personal variations was from analysis of brain activity computed automatically and repeatedly so as to provide statistically significant figures; this analysis was found to be related to the repertoire of ideas and actions of the individual in such a way that a high variance of brain rhythms was correlated with a large repertoire of behavior, while monotonous, invariable brain activity was associated with a stereotyped and highly specialised habit of behavior. Over the whole range of variation, the "intelligence" of the subjects was high and their personalities were within normal limits by psychiatric standards; this parameter is not related to how *well* adaptation is achieved but rather to how it is attempted and in how many ways it is achieved. There are obvious relations here to other concepts, for example, to the Pavlovian parameter of "lability" or "volatility," which Pavlov considered high in both strong, choleric or sanguine types of dog and in weak melancholic ones, but low in the strong phlegmatic temperaments. An even more significant and general similarity is to the Law of Requisite Variety enunci-

ated by Ashby(4) and which he again compares with the concepts of Sommerhoff (5) and with the principles derived from the Communication Theory of Shannon(6).

The Law of Requisite Variety states that if a complex system (for example a human being) is attempting to control the outcome of a situation, then that system must have an intrinsic capacity for variety that matches the variety of the situation. This is because "control" means reduction of the number of possible outcomes of the situation to a certain smaller class which are generally described as Good or Correct. In a real complex life-or-death situation a system with the requisite variety will be able to survive by finding an appropriate mode of response, while another with inadequate variety can make fewer responses with a correspondingly smaller chance of survival. In the experimental conditions of our investigations, survival is not at stake, but the situations are deliberately contrived so as to be ambiguous and to offer the subjects several modalities of stimulus and response as a means of avoiding a disagreeable penalty, or achieving formal gratification. Some choose one way, some another, some use parts of all the types of information, some vacillate between one extreme preference and another. This is not surprising or novel, but the important observation is that the character of this response complex is related to the features of the intrinsic and evoked activity in the brain, and to the manner of participation of the involuntary mechanisms mediated by the autonomic nervous system.

Our early experiments on these lines suggested that adaptive behavior of this type, closely analogous to and probably homologous with the formation of conditioned reflexes, is essentially a *statistical* process, which involves first the selection of relevant information from the background of "noise" or random change, second the storage of the information so selected and classified, and third the combination of the stored select information with fresh events or disturbances, so as to provide a relevant and effective behavioral control. This hypothesis too I have elaborated elsewhere; what concerns us here is the evidence that in human beings there is a wide variety of *detail* in the way these processes are carried out. The principles—one might say the mathematical laws—according to which information is selected and stored, are probably universal and ineluctable, but the way in which the principles are applied by any particular nervous system is a very personal matter.

The personal preferences and idiosyncrasies that intrigue us so much in daily life and baffle us so profoundly in the laboratory can be seen even in the mechanical devices we have made to embody these hypotheses. There are at least half a dozen machines in existence which imitate quite successfully the selection, storage and recombination function which we call Learning. All these educable machines exhibit the powers and limitations of an adaptable organism; but all are different in many important respects and these differences are apparent at all levels and stages of their operation. Even within a single artificial species—for example my own *Machina docilis*—individuals with the same technical specification develop idiosyncratic traits, *and these are cumulatively amplified by experience*. Some of these differences seem trivial—for example, one synthetic animal may store relevant information as an electric charge, another as a chemical reaction, another as a magnetic field—but such variations are not so trivial if one considers these artificial organisms as forming a community. How is a system that operates with magnetic tape to communicate with another that needs punched cards or flashing lights? Obviously one can make a suitable interpreter, but we know that behind every translator lurks a traitor, and that all organisms tend to consider their own system of reception, storage, communication and control the best, if not the only legitimate language.

What I am suggesting is that the variations of brain activity and somatic response we observe in human beings during learning are evidence that, even among those born and raised in the same culture, speaking the same language and facing the same basic problems, there are differences—some at least innate—in their brain language, at least as great as those in their

eye color or their blood groups. We do not attach much importance to these latter traits (though there *is* evidence that eye color is related to vocational trends, and in our present society, the interchange of tissues by transfusion and grafting is becoming so commonplace that specific immunity reactions are beginning to influence survival—it has been suggested that if radiation sickness were to become an endemic malady the most important factor in survival might be to have an identical twin whose bone-marrow could be used to replace one's own.)

But the nervous system is in a different category of biological importance, and slight discrepancies in operational techniques between individuals may be expected to have profound effects on social interaction and joint activities. Although the physiological approach to personality and social interaction is still in its earliest stages, it is already worth discussing the intimate details of the mechanisms that underly these essential human characters.

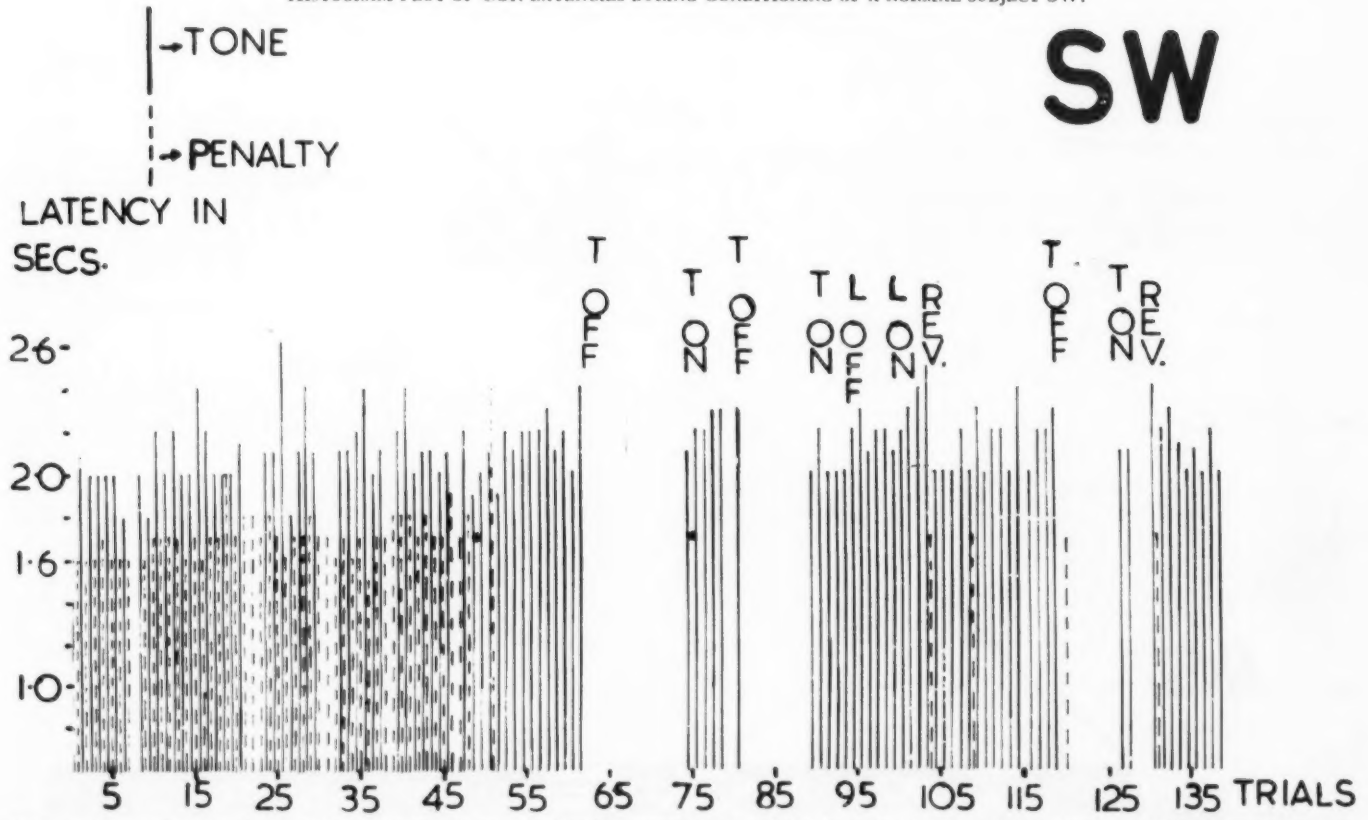
The old idea of the nervous system as a compact but deterministic telephone exchange has long since given place to more sophisticated images based on contemporary engineering and communication. These are less obviously misleading, but really only because the mechanisms of computors, radars and self-directed missiles are less familiar to most of us and may even be officially concealed, and we are only equating two unknowns. Analogies are no substitute for observation though they may—and do—suggest what observations are worth making. I have already referred to the study of the spontaneous or intrinsic activity of the brain as evidence that the nervous system is not merely a passive network awaiting stimulation; I should like to introduce two other sources of information which may help to outline the nature of individual cerebral vitality.

We tend to take very much for granted the rationality of everyday behavior; few realised until recently how much this depends on our immediate and constant contact with the outside world. The experiments initiated in Montreal by Hebb and his colleagues(7) and since repeated with variations in several centers have shown that even quite sane and balanced human beings rapidly lose their grip on reality when the volume and variety of sensory signals are artificially reduced. If we were limited to a telephone exchange model of nervous activity we would have to suppose that when no calls were made for a few hours, all the bells started to ring at random. Whatever its nature, the nervous system cannot sustain a condition of passivity for long—there is a positive tendency to exploration and speculation—which becomes explosive when unrestrained by the pressure of environmental circumstance.

From another source comes evidence of how this restless exploratory ebullience is controlled and modulated, matched to the necessities of survival and the possibilities of control. Again in our ingenuous physiological youth we assumed simply that any environmental change that was adequate to stimulate a sensory end organ would set up trains of nerve impulses in appropriate frequency-modulated volleys which, emerging finally in the specific receiving zones of the cerebral cortex, would inevitably reproduce in some electrochemical form an image or projection of the initial event. Here, in general, the physiologist lost sight of the process, though he might catch it again in the emergence of some response, if he were dealing with a simple situation in which the response was recognisably related in time or character to the sensory event. And of course for many years physiologists restricted themselves and their preparations—by anaesthesia or mutilation—to just those conditions in which this rare and often artificial simplicity was maintained. More recently however, thanks to the introduction of many new techniques in surgery, engineering and biology, it has become possible to observe the subtle and varied relations between external and internal events in entire animals and even in human beings. One of the most significant discoveries has been that external changes, even though they may be quite adequate as physiological stimuli, do not necessarily evoke responses in the central nervous system. In animals, the central electrical responses to a strong stimulus may be almost totally suppressed when the novelty of the event

FIGURE 1

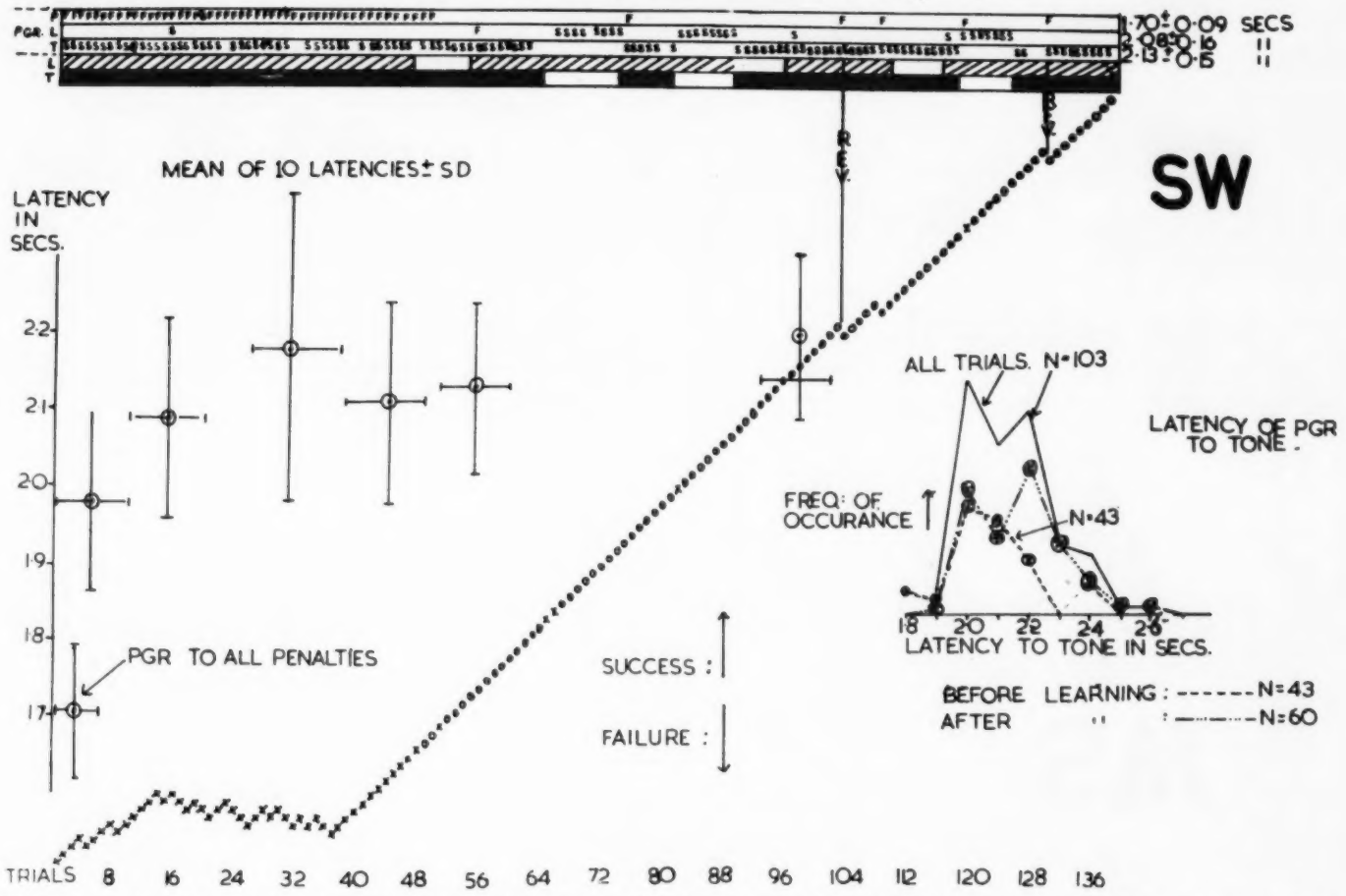
HISTOGRAM PLOT OF GSR LATENCIES DURING CONDITIONING OF A NORMAL SUBJECT SW.



Number of trials are on the abscissa ; latencies in seconds on the ordinate. Responses to unconditional penalty stimuli are dotted, those to conditional warning tones are solid lines. Note the consistent brevity of the unconditional as compared with the conditional latencies.

FIGURE 2

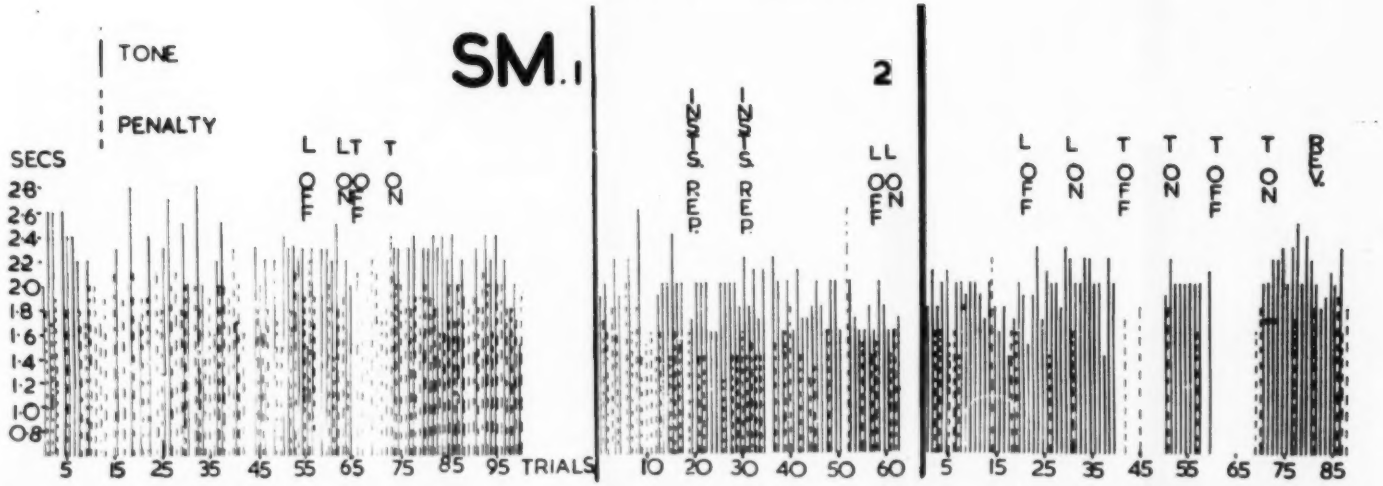
CONDITIONING CURVE AND GSR LATENCY DISTRIBUTIONS IN SUBJECT SW.



There is no overlap between penalty and conditional latencies, but the scatter of the latter is greatest just before the appearance of consistently correct responses. Correct responses are plotted upward, incorrect downward. Defensive movements are indicated by crosses, anticipatory avoidance by circles.

FIGURE 3

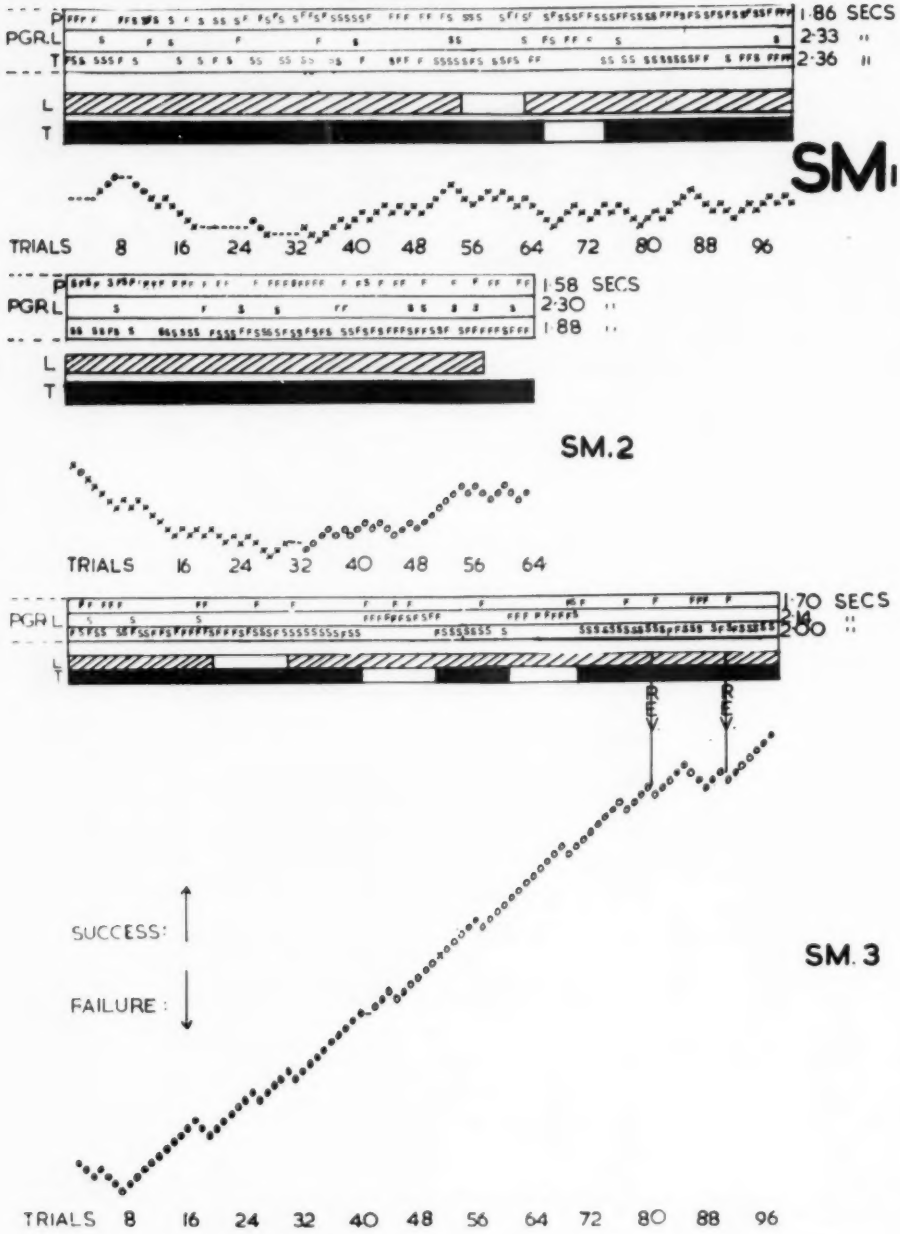
GSR LATENCIES FOR NORMAL SUBJECT SM.



There is greater scatter and overlap between unconditional and conditional latencies at first but the distinction emerges later when correct responses finally appeared.

FIGURE 4

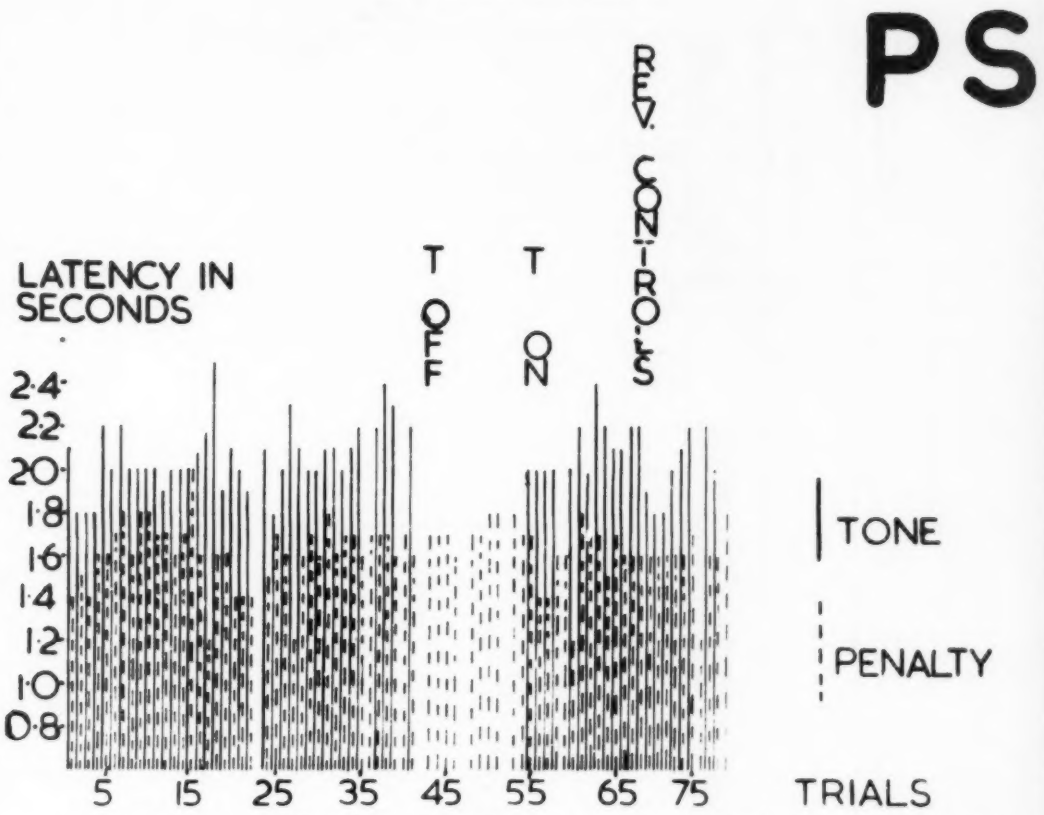
CONDITIONING CURVES FOR SM.



There was no significant adaptation until the third series, after 170 trials.

FIGURE 5

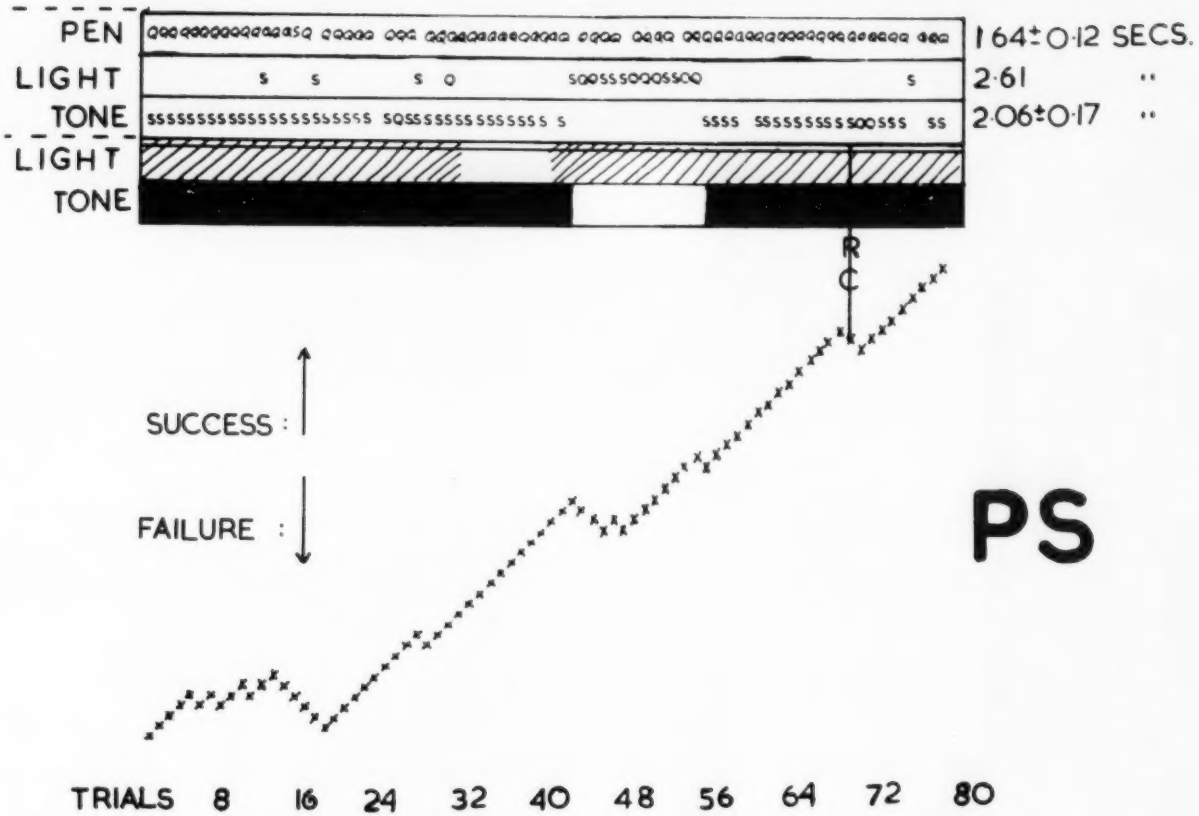
GSR LATENCIES OF PATIENT PS.



The distinction between unconditional and conditional latencies is clear, but unconditional responses persist since there were no attempts at avoidance responses.

FIGURE 6

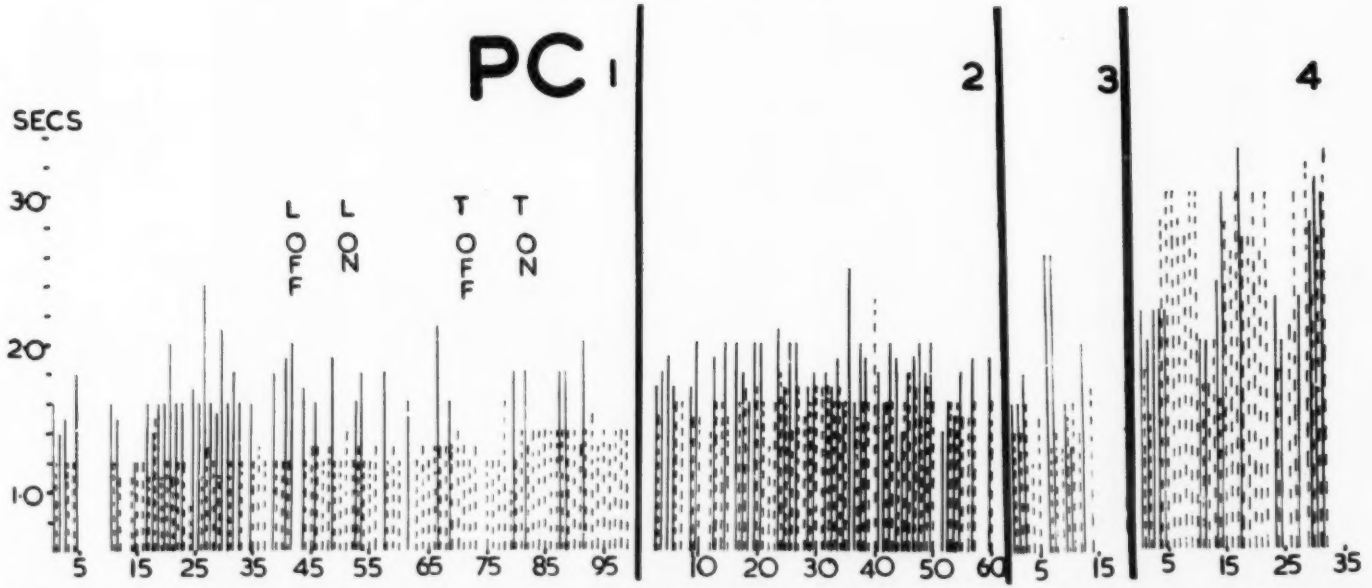
CONDITIONING CURVE OF PS.



A sequence of correct defensive movements began at trial 19 but there were no anticipatory avoidance responses.

FIGURE 7

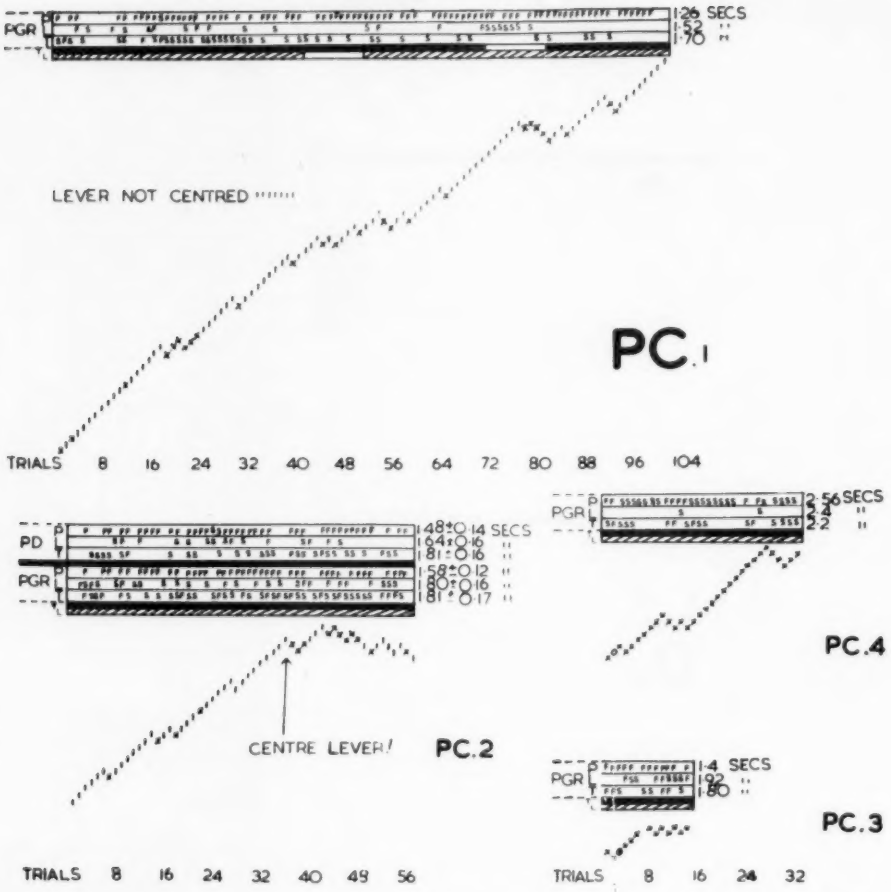
GSR LATENCIES OF PATIENT PC.



In the first series, before treatment, the latencies are all shorter than normal but the distinction between unconditional and conditional responses is clear. Unconditional responses persist because the subject never attempted to avoid the penalty. After treatment (Series 4) the unconditional latencies are markedly increased, the conditional responses are rare and variable.

FIGURE 8

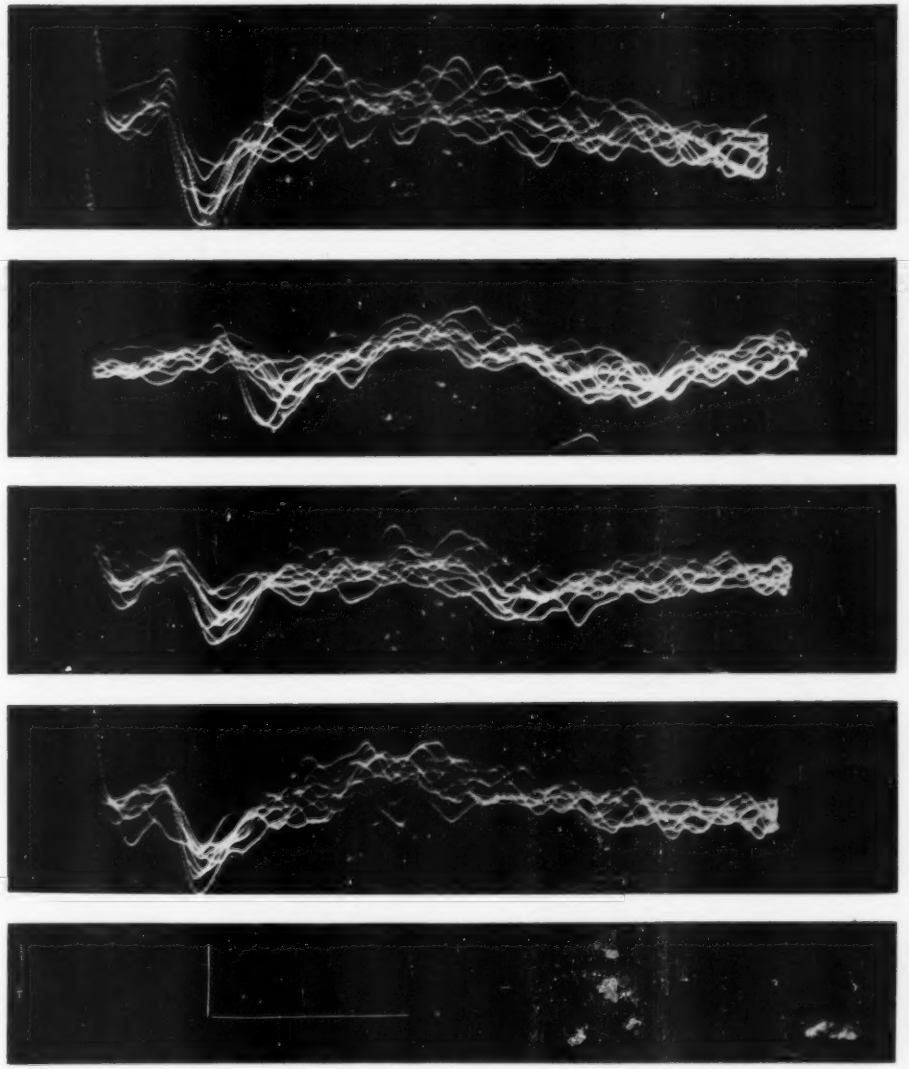
CONDITIONING CURVES OF PATIENT PC.



The upward trend is misleading—the subject kept the lever on one side and reversed it whenever she heard the penalty (indicated by vertical dashes).

FIGURE 9

NON-SPECIFIC GENERALISED ELECTRICAL RESPONSES TO VISUAL AND AUDITORY STIMULI WITHIN THE FRONTAL LOBES OF PATIENT PC. SUPERIMPOSITION OF 10 RESPONSES:



A. Response to clicks at random intervals at electrode implanted in left lateral frontal cortex.

B. Responses to flashes at random intervals at the same electrode. Note short latency and constancy of click responses contrasted with longer latency and habituation to visual stimulation. Similar non-specific responsiveness was found in many frontal regions of both hemispheres in this patient.

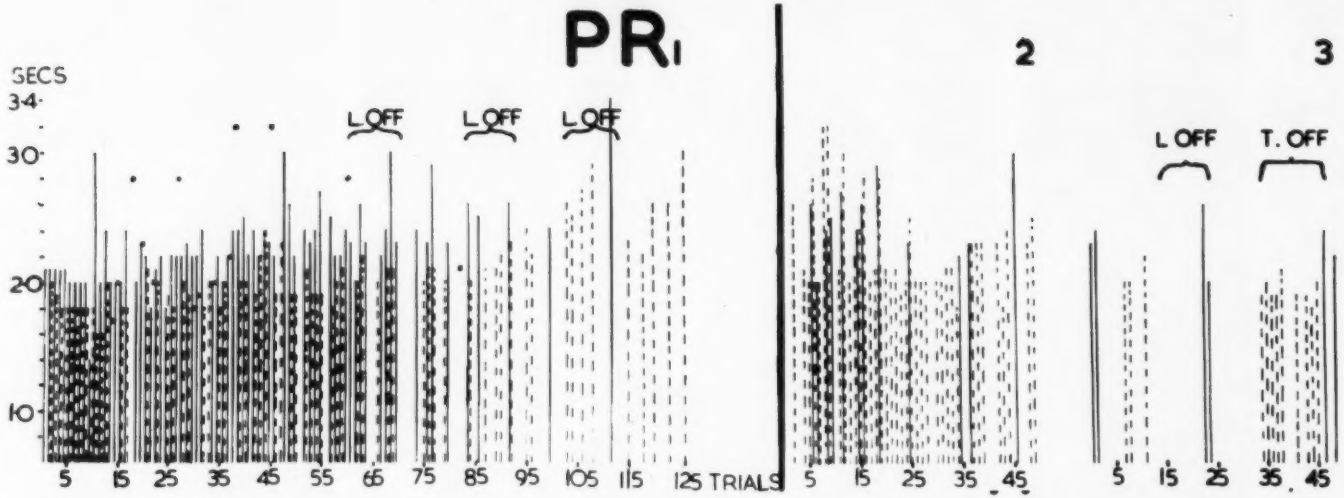
C. Effect on responses to combined flash and click of distraction by conversation.

D. Effect on combined responses of directing attention to the stimuli.

Calibration: 100 microvolts, 100 milliseconds.

FIGURE 10

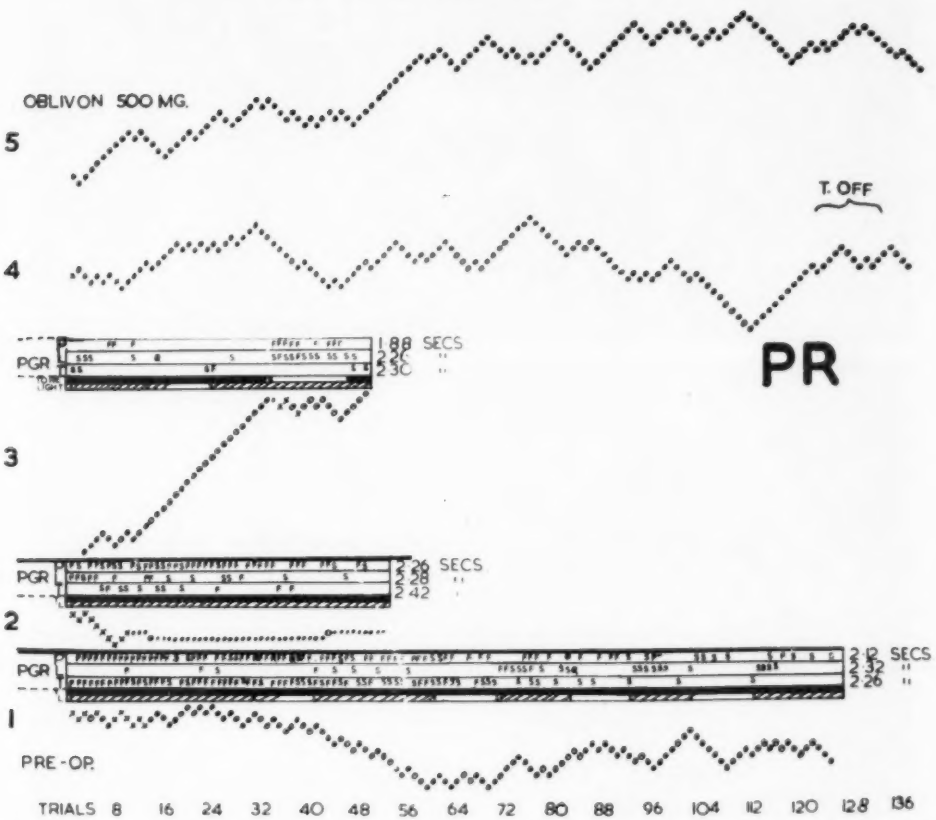
GSR LATENCIES OF PATIENT PR.



In contrast with PC all latencies are unusually long and the distinction between unconditional and conditional responses is less clear. At about Trial 65 the conditional responses disappear and at the same time the unconditional latencies increase from about 1.8 to about 2.8 seconds.

FIGURE 11

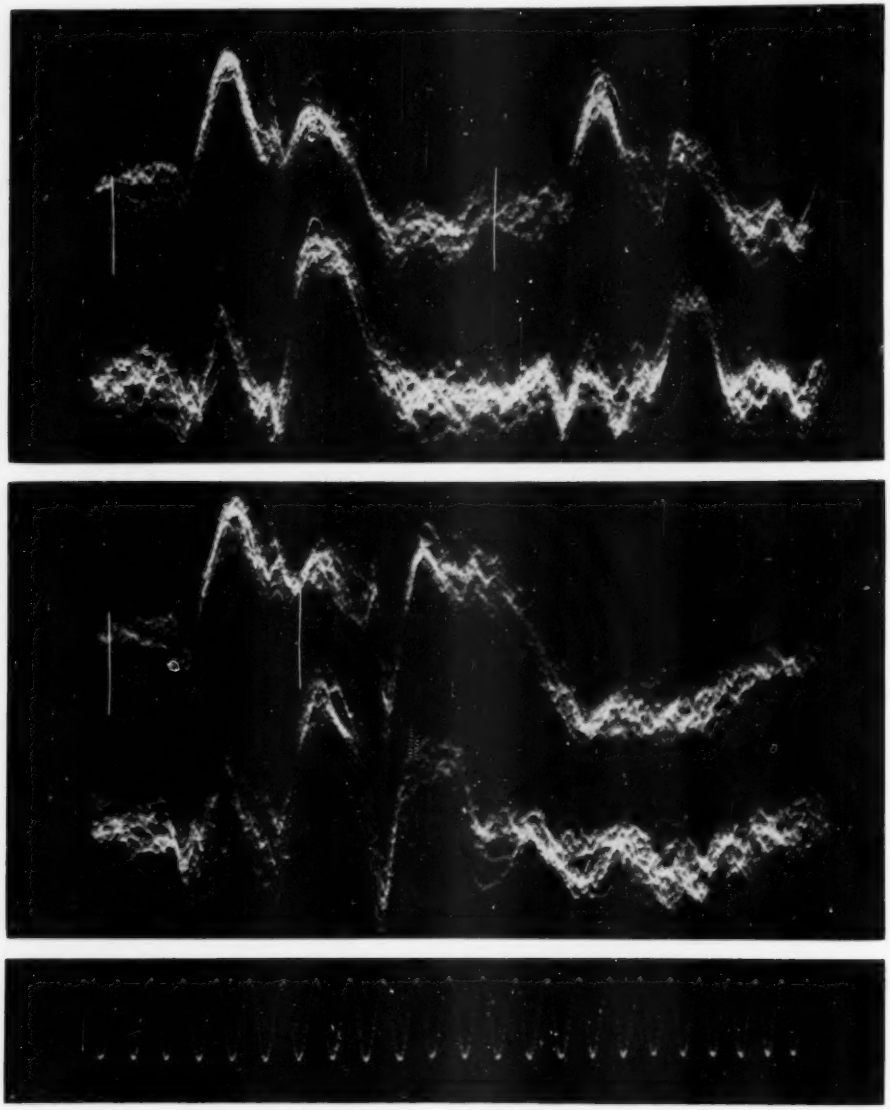
CONDITIONING CURVES OF PATIENT PR.



There was no sign of adaptation over 175 trials. In the first series (before electrode implantation) nearly all responses were anticipatory but quite random and uncorrected by failure. In series 3 after intracerebral polarisation there was a significant sequence of 23 correct anticipations but this was broken by withdrawal of the tone stimulus. Later series showed no adaptation.

FIGURE 12

SPECIFIC LOCALISED RESPONSES EVOKED BY RANDOM FLASHES IN DEPTHS OF OCCIPITAL LOBE IN PATIENT PR.



These show no habituation but were sensitive to changes in intensity, interval, color, overbreathing and inhalation of CO_2.

A. Responses to flashes separated by 230 milliseconds top trace from electrode in optic radiations, lower from electrode one cm. posterior.

B. Responses to flashes separated by 113 milliseconds. Note the large positive (down-going) pulse that appears with the shorter stimulus interval, and the after-discharge, phase locked to the stimulus. Calibration: 100 microvolts, 50 c/s

wears off with repetition or if the creature is distracted by other events. Contrariwise the response may be augmented when the stimulus acquires significance by association or even minor alteration. This has been shown particularly clearly in animals by Hernandez Peon, Scherrer and Jouvet(8); by Galambos(9) and we have seen these effects ourselves in human beings. The fact of special importance for the subject of this lecture is that this vital control of correspondence between brain and outside world is not an internal reorientation of domestic intracerebral complexities, but a direct, emphatic blockade reaching out even to the receptor itself—a change in Foreign Policy. Again resorting to the obsolete telephone image, it is not that some calls are unanswered but rather that some callers are denied access to the instrument. There is an obvious and significant paradox here: if a brain imposes a strict censorship on a certain class of signal, how can it maintain the blockade without receiving the signals at all?

A verbal explanation of such effects can never be very satisfactory because of the ambiguities of everyday speech and as I have mentioned, in our experience it is far better to make an inventory of the real phenomena and incorporate these in a working model of the simplest possible design in order to see how difficult the problem really is. In experiments now in progress designed to test model hypotheses of habituation and association we have come across some clues to how and where the vital operations of discrimination and selection are performed within the brain.

It is fairly obvious that since the nervous system can and must classify certain events —in fact the majority of events—as insignificant, redundant or irrelevant, then some part of the system must be able to act as a filter, set to reject signals referring to this category and to recognise and accept signals relating to events in the complementary class of significant or novel. In some conditions the nature of this significance filter seems to be quite simple, almost as though it were a physical template or gauge rejecting all signals except those that satisfy certain canons of size or quality with a reasonable tolerance for random variations. In other conditions the selectivity is so high and yet so peculiar that it is impossible to imagine any artificial mechanism that could duplicate it. What are the differences in these conditions that seem to reflect at one extreme a rudimentary measurement and at the other a cultivated taste?

The nearest we can come to an answer at present is that it is a question of *sample size*. All our experiences are only samples of the whole universe, and we cannot always decide how representative any particular sample may be. None the less an organism, in order to survive, must as it were, assume quickly that certain small samples of experience are quite trustworthy. When a child is born its respiratory apparatus operates on the inspired assumption (if you will forgive the metaphor) that the first lungful of air is a reasonable sample of the atmosphere. The assumption is embodied in the genetic mechanisms that determine the structure of the infant's brain-stem, muscles and so forth. The compound reflex processes we sometimes still call instincts are the expression of basic assumptions of this sort about the world. In general they are essential to immediate survival and show little variation; they operate rapidly and are *unconditional*. They operate rapidly because only one or few samples are needed and verification is not required. They also tend to involve quite a large proportion of the organism and some of them are only moderately specific —they are evoked by the general or common rather than the special or unusual properties of the stimulus situation. We know only too well that the instinctive behavior of mammals and particularly of primates is hard to isolate and study and we can only envy the relative ease with which ethologists can analyse the Innate Releaser Mechanisms in birds and fish. However, there is one property of instinctive behavior that seems to identify it even in ourselves—its special relation to the autonomic nervous system.

For some generations now we have been accustomed to consider the sympathetic sections of the autonomic system as a vestigial and rather tiresome heritage from our rude and ingenuous forbears. For us,

an apparatus adapted to fight or flight is an embarrassing reminder of a primitive past—our ideal is to fight only under compulsion and never to flee. Many psychiatric clinicians indeed have asserted that their practice would vanish if sympathectomy were as common as tonsillectomy, and it can be argued that in a culture where tolerance and fortitude are admired, the physiological mechanisms subserving rage and fear are not merely redundant but pernicious. Be that as it may we are literally saddled with this atavistic encumbrance and in our laboratory studies at least we can find a use for it as an indicator of neurohumoral mobilisation.

Only a few of the effects produced by activity of the sympathetic nervous system can be detected and measured on the body surface, and, in the experiments I have referred to, we are in general limited to the most inconspicuous contacts with our subjects. Of the accessible phenomena, we have paid most attention to changes in pulse rate, blood pressure, respiration and skin resistance; there are also of course more subtle and indirect actions on the central nervous system itself but these are so intricate and variable that I shall only be able to report them briefly later. The simplest and most nearly specific effects are, we find, those due to changes in the sympathetic control of the skin organs, variously referred to as galvanic skin reflexes, psycho-galvanic responses and electrodermal reactions. As we all know, this phenomenon has a long, scientific history, as well as vulgar associations with "lie detection." I need not enlarge on the details of this but for those familiar with the technical details I may say that we have considered particularly the changes in skin resistance, the so-called "Féré" effect as opposed to the potential changes or "Tarchanoff" effect; the relation between the two is still confusing. Our technique is arranged so as to indicate at the same time both the absolute skin resistance and the changes in resistance on suitable scales, and we often record changes from several parts of the body at the same time in order to distinguish between segmental and global responses.

The GSR is—compared with brain activity—a very simple effect. Typically it consists of a transient fall in resistance of the skin, lasting a few seconds and varying in amplitude according to the state of the subject and nature of the stimulus. The form of the resistance change varies very little but its latency does show significant variations and it is this factor that we have found of particular interest in relation to problems of habituation and learning. Again compared with central nervous effects the latency of the GSR is very long: about 2 seconds is the figure usually quoted. A large part of this latency is due to the very slow propagation rate in the sympathetic nerve fibres; responses in the foot occur about one second later than those in the hand, and the propagation velocity is only between 1 and 1.5 metres per second. As well as having a longer latency, the more distal responses are also more sluggish and prolonged, suggesting that they are evoked by a protracted heterogeneous train of impulses rather than by a synchronous volley.

In our experiments with human conditioning, three types of stimuli are presented; a gentle warning tone of high or low pitch, a flashing light giving triplet or doublet flashes (these are neutral stimuli later to be conditional ones), and a painfully loud penalty sound which the subject can stop or avoid by moving a lever to the left when the low tone and doublet flash are presented, to the right following the high tone and triplet flash. The subjects have to discover this association for themselves—they are given no explicit instructions—but the penalty is disagreeable enough to provide a powerful incentive to succeed, and it evokes large consistent GSRs; it is in effect the specific or unconditional stimulus. The warning tones and lights also usually evoke GSRs, particularly at first, and in the course of a conditioning experiment we therefore record some hundreds of GSR deflections. In our research group it is my wife's task to measure and analyse the records, and in going through the traces of autonomic variables to calculate the average GSR latency, she noticed a peculiar relation between the latency of the GSR deflections and the nature of the stimuli. The GSR following the UCS (the penalty

noise) had a short latency, about 1.7 seconds in the hand of a particular subject (SW), while those following the neutral or conditional stimuli (the tones and lights) had a much longer latency, about 2.1 seconds. When both sorts were averaged, the mean came to about the accepted figure of 2 seconds but in fact there were two distinct populations of GSR; the distribution was bimodal, with almost no overlap between the two categories. The clear distinction between these two types of GSR can be demonstrated very clearly in a histogram when latency is plotted on the ordinate and number of trials on the abscissa; the unconditional responses to penalty are shown as dotted lines and those to the conditional stimuli as solid ones. (Fig. 1) In a normal subject all the dotted lines end around 1.7 seconds whereas the solid ones extend from 2.0 to 2.2 seconds. These differences may not seem very impressive (though they are highly significant statistically), but these responses are in the hand which is about a meter away from the central nervous system by way of the cervical sympathetic ganglia and from the observed latencies we should subtract about one second for peripheral propagation time. This leaves 0.7 and 1.2 as the unconditional and conditional latencies; we may say that the sympathetic responses to the conditional stimuli take nearly twice as long to emerge from the brain as do those to the unconditional stimuli. During the conditioning of a normal subject the GSRs to the UCS of course disappear with successful avoidance of the penalty, but the responses to the conditional stimuli remain long in latency though they generally become more variable at about the time that signs of learning appear. (Fig. 2)

As far as we can see the acquisition of the novel relevant response in normal persons takes place in 4 stages; the first corresponds with what Pavlovian workers call Extinction of the Orientation (or Orienting) Reflex. At this stage all the stimuli are fairly novel and equally likely to be significant; all may evoke GSRs, the tone is usually followed by some reduction or even suppression of the alpha rhythms in the brain (if there are any), the pattern flicker evokes its characteristic replica response in the visual areas, often combined with synchronisation and phase-locking of some alpha component, and the penalty noise evokes a general startle response, including alpha arrest, a muscular jerk, acceleration of the pulse, a gasp and often an exclamation of pained surprise. The instrumental response is a single reaction, an abrupt movement of the control lever, which may equally likely be in the correct or incorrect direction. From here on the development of the responses is a highly individual matter, but in most normal subjects the next stage involves a series of trials and errors; the physiological responses to the neutral stimuli show some signs of habituation but the startle response to the penalty persists; there is usually no attempt at avoidance or anticipation, the lever being moved only after the penalty is received, as a *defense mechanism*. It is easy to illustrate this graphically, the number of trials being along the abscissa, correct responses plotted in an upward or positive sense and incorrect ones downward. Thus, when the responses are random, the learning curve will tend to remain horizontal since there will be an equal number of upward and downward deflections, while a series of correct responses is seen as a curve rising at 45°. Defensive responses, that is those made *after* the penalty, are plotted as crosses, avoidance responses are shown as circles.

In the most straightforward normal subject (SW), an intelligent, self-confident young engineer of wide interests, the first responses were quite random and the curve remains horizontal, but at the 38th trial there appeared a series of 10 correct defensive responses, a run of successes extremely unlikely to be due to chance. At this stage of successful defence the pulse rate, which had risen from 75 to 110 at the beginning of the experiment had fallen to 85 and the GSRs to the light (which were rare even at first) had disappeared, suggesting that the subject was being guided by the pitch of the warning tone rather than by the flicker pattern. Accordingly the flicker was omitted at the 48th trial, which evoked a correct defensive response, and at the next trial appeared the first correct anticipatory avoidance response to the tone followed by

5 further avoidance successes. The flicker CS was then re-presented with the tone which still served as a clue to correct defence. After a sequence of 10 more successes, the *tone* was omitted and the next two responses, though correct, were not anticipatory, but after this, correct defensive anticipation was evoked regularly by the flicker patterns alone. When the tone was re-introduced however, the response was made to this, the first CS, rather than to the light, and when the tone was again withdrawn there was a single failure to anticipate, but from then on only one error was made, accompanied by a deep sigh and theta rhythm in the EEG. Altogether 100 trials were needed to perfect this very simple response adaptation. The completeness and certainty of the response were tested by arbitrary reversal of the control rules; inevitably the response to the first trial under the new rules was wrong, but at the second the subject reversed his own procedure and made no mistakes, though the instrumental response time was almost doubled, from 0.8 to 1.5 seconds for the next few trials. The sudden reversal of rule not only provoked the inevitable unconditional GSR but a pulse acceleration from 75 to 90, a series of gasping respirations, and a slight shortening of the conditional GSR latency to subsequent trials. Further reversals and presentations of tones and flicker alone showed that the subject was now in complete control of the situation and after 139 trials the EEG began to show signs of drowsiness and boredom so the experiment was terminated. In spite of his complete operational success the subject gave a very inaccurate description of the experimental arrangements. His subjective estimate of the time taken for the whole experiment was 1¾ hours instead of 2½ hours; he was convinced that the aim of the experiment was to muddle him; he described two types of penalty, both very unpleasant, and was sure that the presentation of high and low tones and "fast" (triple) and "slow" (double) flashes was in some significant sequence such that he should move the lever to the right after a sequence of three low tones. He admitted he began by random responses but said he kept trying to catch the sequence of signals but lost it later. In fact, of course, the order of presentations was random throughout and he only began to succeed when he "lost" the sequence. This search for significant sequences is quite typical and indeed almost invariable; in these particular circumstances it is of course quite futile and indeed eliminates any chance of success. Some subjects who end by responding quite correctly and quickly are still convinced that they are following a sequence which somehow they cannot quite describe.

Returning to the distinction between unconditional and conditional GSRs by latency we can see in this typical normal subject that never at any time, even after an unexpected and complete failure, were the conditional GSRs as short in latency as the unconditional ones and further, the unconditional responses were just as large and quick at the end of the experiment, when the controls were reversed, as at the beginning. We may infer therefore that, however this subject, as a representative of a normal population, may have interpreted his experiences, his nervous system was capable at all times of discriminating between events requiring rapid and unconditional response and those of more doubtful and conditional import.

We may now consider the behavior of other subjects, in order to see how these observations may illuminate some of the mental aberrations and anomalies of interest to psychiatrists. Before describing strictly clinical applications we may glance at two subjects whose conditional behavior is on the borderline of normality.

The second subject, (SM), is a normal man, a scientist from a country in Europe noted for its war-scarred history and spirited intransigence. For this subject the brief instructions given before the experiment were even less helpful than for most people because of his limited English; he was rather tense and apprehensive, knowing something of the general purpose of the experiment and feeling on trial. A glance at the plot of GSR latencies shows how this state was reflected in autonomic terms. (Fig. 3) There was a wide scatter of the conditional and unconditional latencies and there was some overlap between them.

As the experiment progressed the scatter diminished and the pattern approximated to that of the normal subject. The learning curve, however, has a different story to tell; there was a long monotonous series of failures with no attempt to anticipate or avoid the penalty. (Fig. 4) The experiment lasted so long and the experimenters themselves became so exasperated by the endless succession of penalty squawks (which are repeated to the observation room) that the instructions were repeated and later a recess was called and the procedure resumed after lunch when further exhortation was provided in the form of emphatic repetition of the instructions which imply that the penalty can be avoided. After a total of 132 trials the subjects began to perform anticipatory responses, but without significant success until trial 170, from which point his attainment paralleled that of the first subject, with appreciation of both visual and auditory conditional stimuli and quick adaptation to control reversal. This subject also sought for sequences, and tried to pick up time interval clues by counting his own pulse. Since this varied from 77 to 114 during the various phases of the experiment his estimates were not only useless but grossly inaccurate.

It is striking that, comparing these two normal healthy young men of similar intelligence and alertness, provided with the same information in the same situation, one should take over 4 times as many samples as the other to establish control over a very simple mechanism. If the consequences of failure had been serious—for example if the control lever had been the control column of an aircraft, it is obvious that the first subject would have had a much higher chance of survival than the second whose "nerves," evidenced by his autonomic lability, were responsible for much of his early failure, leading to later despondency and defeatism, alternating with over confidence and futile ritualistic obsessions. It was not until the autonomic responses had settled into unconditional and conditional categories that distinction could be made between novel neutral and significant stimuli.

How we assign to these effects their correct status as causes and effects, and whether we consider the behavior of the second subject during his 170 failures as pathological or as a normal deviant, we must discuss later.

Further toward the pathological extreme is a young male patient (PS), considered as an inadequate psychopath, plausible, ingratiating, ineffective, and prone to solving social difficulties by elaborate lies amounting to confabulation. His GSR plot shows at first a close similarity to that of the successful normal subject SW (Fig. 5). There is a clear latency difference between conditional and unconditional responses, with no overlap; the means of the two classes are exactly the same as in the first subject. A glance at this histogram however, shows that something was seriously wrong; the dotted lines representing the penalty responses continue throughout the experiment, while in the first subject there were none after trial 48 when the avoidance rule was learned. This of course means that no avoidance was attempted by the subject and the story is filled in by the learning curve, which shows not one single circle, no attempt to avoid, only accurate and rapid defence from trial 19 (Fig. 6). This subject was able to associate either or both CS and made only two errors when the controls were reversed at trial 69. The subjective report of this subject showed that although he too expected a sequence of stimuli, he finally appreciated the meaning of the CS patterns, but in effect could not be bothered to avoid the penalty by an anticipatory response since he could not be sure that the penalty would occur until he heard it. It is tempting to translate this behavior into terms of pathological ethics —one cannot be sure that an action is wrong until one is punished for it.

We may now survey two patients exhibiting advanced mental pathology to illustrate how the learning and autonomic mechanisms can reflect total failure of control. The first patient, PC, was a woman of 36 with a 12 year history of compulsive thinking associated with fearful delusions with insight. No treatment, either physical or psychological had been effective, and she was referred for implantation of intra-cerebral electrodes and eventual psychosurgery.

Before operation her autonomic responses were extremely brisk and overactive; this is reflected in the histogram of her GSR latencies (Fig. 7). The distinction between unconditional and conditional responses is clear, but all the latencies are very short, about 1.2 and 1.7 seconds instead of 1.7 and 2.1 in the normal subjects. Here again, the unconditional responses persist through 100 trials—there was no attempt at anticipation or avoidance. The learning curve looks quite different from that of PS however : it appears to mount at 45° straightaway but this is misleading and the curve is made up not of crosses (selective defense movements) but of vertical dashes, indicating that instead of centering the lever after each trial, the patient held it hard over on one side and moved it across to the other whenever the penalty occurred (Fig. 8). This tactic ensures that the penalty be received on half the occasions and that the response involve the slowest and largest possible movement. In effect the conditional stimuli were not used at all, although they evoked autonomic and EEG changes. The warnings were assigned no significance and the patient manoeuvred herself into an extreme situation from which she could extricate herself only by extreme action at a primitive level.

The procedure was repeated 5 days after surgical implantation of 68 intracerebral electrodes. Her general condition was unchanged and her behavior in the conditioning situation was similar. After 36 trials she was told positively to center the lever, after which her response curve became quite horizontal indicating a purely fortuitous series of responses. The only detectable change was in the GSR latency which showed a slight but significant increase to both conditional and unconditional stimuli.

During this period very detailed records were being taken of the intra-cerebral electrical activity, using a number of techniques to clarify both intrinsic and evoked activity. An account of these observations would form a lecture in itself, but one set of records is of particular relevance; it was discovered by chance that over wide regions in the depths of the frontal lobes in this patient there were non-specific electrical responses to a variety of sensory stimuli (Fig. 9). These could be evoked by sounds or by visual stimuli and their latency was quite short : 25 m. secs. for auditory clicks and 34 m. secs. for visual flashes. The responses to visual stimuli showed a marked tendency to habituation after 10 to 20 flashes, but the auditory response persisted unchanged over a series of scores of clicks when there was no concurrent stimulation. When a click was accompanied by a flash, the click response was prepotent, but even the combined response was attenuated during distraction by other stimuli and both click and flash responses were augmented when they acquired extra significance as conditional stimuli. The most striking features of these responses were their very wide dispersion, particularly in the lateral frontal regions of both hemispheres, and their characteristic form—a sterotyped pattern very similar to that found in specific projection regions. Yet these effects were in parts of the brain as remote as they could be from any specific receiving zone—generally the most taciturn of the so-called silent areas.

Recalling what we have said about the need for a high and controllable selectivity in the learning brain, we see here evidence for just the opposite, an indiscriminate over-responsiveness, in which everything may mean anything in general and nothing can mean anything in particular. We may presume that the brevity of the autonomic delay and briskness of the responses were also a reflection of the same lack of selectivity and discernment.

As well as being used for recording, the implanted electrodes were used for progressive electrical polarisation within the brain and to achieve a limited and reversible leucotomy. After the first trials of this method, which was followed by a rather dramatic loosening up of the patient's tension and delusional fears, the conditioning procedure was repeated for the third time. On this occasion the patient kept the lever central and made one correct anticipation followed by several correct defensive responses, but she broke down in tears after 14 trials during which there were signs of severe autonomic disturbance. The polarisation treatment was continued in empiri-

cally identified brain regions; this was followed by marked general improvement; the delusions disappeared and the patient became quite cheerful and active. The fourth conditioning experiment reflects this change in two ways; the GSR latencies were greatly increased (those to penalty from 1.26 to 2.56 and to tone from 1.7 to 2.2 secs.) and the learning curve shows an appreciable gain by defensive conditioning over 32 trials. The autonomic changes were minimal. The patient was discharged on probation at this stage, and her subsequent history, though checkered, has confirmed the apparent relation between her mental state, her neurophysiology, and her learning ability.

The second patient PR was studied in similar detail. She is a woman of 60 with a life-long history of migraine overlaid by 30 years of hysterical extension of the syndrome. Her complaint had resisted all therapy, including prolonged psychoanalysis and physical treatment, and her morale had broken during the last 3 years with depression to a suicidal degree, so that she was referred for intra-cerebral exploration with a view to psychosurgery. Before implantation of the electrodes her behavior during conditioning was in striking contrast to the other patient PC though she also failed completely in associative adaptation. The chart of her GSR latencies shows at first a reasonable distinction between unconditional and conditional responses though all the latencies are rather long (Fig. 10). The conditional responses to tones faded out after about 80 trials and at this phase the latency of the unconditional responses to the penalty began to increase and they also diminished in abundance. This effect was so marked that the average latency of the last 10 unconditional responses is significantly greater than that of the first 10 conditional ones; these changes can be seen particularly clearly when the two types of response are plotted separately. The learning curve is unique in our experience: it shows a completely random response, ending slightly below the starting level (Fig. 11). The nature of the response is quite peculiar—from the 13th trial to the 125th all the movements were *anticipatory*, but were entirely at random, and once the lever had been moved to one side it was left there whether or not the penalty occurred. In this way the patient ensured that she received the largest possible chance number of penalties for the longest possible time. A scalp EEG taken just before the conditioning experiment had shown a dramatic frontal spike response to flicker, but this disappeared and during the experiment there were elaborate multiple responses to pattern flicker in the posterior brain regions, but no indications whatever of diffuse response (Fig. 12).

The experiment was repeated later on the same day with further exhortation and encouragement and on this occasion after 11 trials, 22 correct anticipatory avoidance responses were made. At this stage the GSR chart showed reduction in average unconditional latency to 1.88 secs. and distinction between this and the conditional latency. Omission of the light CS had no effect but omission of the tone resulted in random responses. This suggests that in spite of the clear specific responses in the visual pathways, the visual information was assigned no associative significance.

During this period the intra-cerebral electrodes in the orbital regions of the frontal cortex showed profuse persistent delta rhythm attributed to local electrode lesions. The mental condition of the patient improved and remained excellent for some weeks, but she regressed in spite of polarisation of selected frontal sites. The conditioning experiment was repeated on two occasions two months later and showed reversion to the original pattern. In a total of nearly 280 trials all were random anticipations, in spite of emphatic repetition of instructions. At this time the frontal delta rhythms had subsided and the EEG responses to stimulation were stereotyped and restricted to the visual regions.

The varied and detailed studies of these 5 human beings have been chosen to illustrate and justify the title of this lecture; in all our mental life what happenings are more vital than the incessant meshing of stored and new experience to drive us on to fresh dangers and discoveries? And what, in the puppet theatre of our laboratory could mimic more closely the tragic breakdown of this mechanism than the to-

tal failure of the two patients to control by the twitch of a muscle a situation which could be mastered in a few attempts by the humblest experimental animal ? Where, we must still ask, do these vital things happen and where should we seek the cause and cure of their decay ? The complete answer may always elude us—we have no prior knowledge that there is an intelligible answer, or that we can frame a proper question, but in the observations I have outlined, some pattern seems to be emerging.

In normal human beings, uncorrupted by scholastic tyranny, and capable of exploratory control as well as internal regulation, we can identify two main necessary and sufficient conditions for free life. First, the preservation of a brisk and buoyant autonomic system specialised for—but not limited to—the urgent adjustments of the somatic springboard of action. I have deliberately restricted my account of these adjustments to a few of the simplest and most superficial changes. You will realise that these are but the outward expression of a delicate and personal intimacy between the border regions of the primitive and ancient brain structures, the limbic cortex, and the great mass of tissue in the still youthful external crust of brain, whose evolution has occupied only the last few seconds of the eleventh hour of living time. It is these intra-cerebral relations that most concern us, rather than the external changes they promote, for the alterations in body state are in a sense trivial or at least adventitious. We have seen that the mobilisation of the autonomic allies for cogent action takes some time—a long time by the brain clock that ticks in thousandths and chimes in tenths of a second. This pause, we must suppose, in the normal way is for reflection—not of course necessarily for conscious thought in any useful sense, but for selection and identification of novelty and significance. The second of the two necessities I spoke of are the cerebral mechanisms underlying just these basic processes of cogitation and we can see that here again the necessary sites and structures announce themselves. In a quite novel situation, any prior assumption about likely contingencies may be fatal, so all signals must be dispatched to all departments—"for information only." In physical terms this means that the nerve impulses set up by unfamiliar sensory stimulation must be coded, sorted and relayed to widely dispersed brain regions in a form which will ensure attention but restrain action, while not impeding or interrupting work in progress. The recent and revolutionary studies by Moruzzi, Magoun(1), Jasper and their colleagues have demonstrated how and where these essential, subtle functions can be performed ; there are in fact neural mechanisms for the broadcasting of sensory information within the brain—the diffuse, non-specific radiations from the reticular formations in brain-stem and thalamus. In animals the functions of this system have been rather vaguely described as "arousal" and "alerting" ; I am suggesting that though they may be non-specific in their projections, these functions are quite specific in their relation to behavior and particularly to learning.

We still lack much essential information and there are surely wonderful discoveries still to be made ; it would be wrong to make dogmatic assertions but precise hypotheses we must have if our discoveries are to be of more than academic interest. I suggest that, from such observations as I have described here we can envisage at least three basic functional sub-categories or modes of central nervous action related to mental action, all involved with and depending on the basic neuro-humoral operations of the autonomic system.

First, there are the unconditional responses to specific stimuli which I still consider legitimately as instinct in the literal if not the literary sense. Most of these responses are quite elaborate and may involve nearly all organs, but they require neither discrimination nor internal reflexion though they are reflexive in their mechanism. They must therefore depend upon a diffuse transmission, not to the cortical levels so much as to the hypothalamic and autonomic effector pathways. These responses are brief in latency, stereotyped in pattern and usually reinforced and protracted by hormonic support, particularly from the adrenal glands. The role of these response patterns is of course

mainly homeostatic and their variety is limited—by evolutionary necessity—to match the limited number of predictable environmental changes likely to be encountered by any particular species. This may seem to contradict the suggestion that these aspects of behavior are related to mentality, but we should recall that even the most fundamental and primitive action of all —respiration—is so closely linked with thinking that our Mediterranean ancestors attributed to breathing movement much that we would describe as mental activity ; hence we derive all our words containing the syllable—phrene—. No one would suppose that schizophrenia was due to a split in the diaphragm but in records of respiration we can trace quite easily clear associations with mental state, and we should be reassured to recall that the respiratory centres are anatomically embedded in that reticular formation to which we must assign so many essential properties.

Next, are the responses to novel and apparently neutral stimuli. In contrast to the unconditional homeostatic processes these are an expression of orientation and invention since they are not programmed in any useful sense and must involve much more elaborate neural mechanisms. They are easily confused with instinctive responses because they have many common effector pathways, particularly in the autonomic outflow. The distinction between the two can be made only by careful observation of the time relations of the central and peripheral effects and the alteration of the responses with the passage of time. The most important distinction is, of course, that the response to novelty must involve widespread cortical diffusion of signals, whereby the degree of innovation can be recognised. This is the process, presumably, that takes time ; the central files and records, whatever they may be, must be searched and scanned for similar events and a preliminary entry must be made if no trace is found of the dubious experience, which, for good or ill, must be tentatively classified in some way until further information is available.

The third category is the one to which we have paid most attention ; the selective sorting of consecutive or related events so as to construct within the nervous system a working model of the outer world with enough detail and accuracy to permit coherent and relevant actions of control. We have seen how vulnerable these mechanisms are—they may fail altogether in people who are still capable of a nearly normal existence in protected environments. Since they require a great versatility of cerebral performance, the widest possible repertoire of functional configurations, failure in these processes can occur in any number of ways. As we have seen, they may fail by overemphasis within the brain of broadcast information, the deadening by incessant propaganda of individual character, or by blockade of the normal services, by censorship without discrimination or appeal. They may also of course be grossly perturbed by overaction or degeneration of the mechanisms subserving instinct or innovation—this too we have seen in individual subjects.

For many of us the new intricacies of psychobiology are beyond our mental grasp —none of us I think can yet appreciate in its full grandeur the panorama of mental physiology as revealed in the oblique light of dawning revelation. We may find in social parallels some analogy to the potential freedoms of the cerebral community. In searching for the model of the democratic ideal we need not look as far away as Athens or Westminster—within our heads we carry the free society, for we find no boss within the brain, no oligarchic ganglion or glandular Big Brother. In this small space our very lives depend on equality of opportunity, on specialisation with versatility, on free communication and just restraint. It is here that vital things have their beginnings and their developments and it is here too that our proper studies should begin.

Recalling again Meyer's expostulation "I wish it were possible to get rid of the words"—we may well feel our intellect is being swamped and suffocated in glutinous phraseology—these Greco-Latin hybrids such as "psycho-physiology" may be the sterile offspring of a marriage of technical convenience. But I hope that in these glimpses of our newborn offspring we may

recognise the natural and fertile issue of a union of passionate necessity.

One of the most satisfying aspects of this sort of investigation is the need for real team-work, depending on complementarity of training and aptitude, collective responsibility for the general strategy, and delegation of operational authority. In the experiments described here, Dr. H. J. Crow is responsible for all clinical applications and interpretations, Dr. R. Cooper for solution of the physical and technical problems, my wife, Mrs. Vivian Walter and Mr. Arthur Winter for management of the experiments and Mr. W. J. Warren for the construction and maintenance of the equipment. In addition, it is a pleasure to acknowledge the close co-operation of our surgical colleagues, Mr. George Alexander, F.R.C.S., and Mr. Douglas Phillips, F.R.C.S. An essential member of any such team is what is sometimes called a non-playing captain, who can see the whole situation with detachment and perspective; in this capacity Professor Golla has for many years inspired and directed these investigations.

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DISCUSSION

Lawrence S. Kubie, M.D. (New York, N. Y.)—Rarely have I had a more challenging, fascinating and difficult assignment. Two streams converge in this lecture. The headwaters of one derive from Adolf Meyer, who foresaw that the subtle complexities of human psychology would be explained in neurophysiological terms only when these became more subtle and complex than what Meyer used to refer to scornfully as the "neurologizing tautologies" of his day. He foresaw that "Where vital things happen" could be explained only by a neurophysiology with a new subtlety and a new vitality. This is precisely what we have had the privilege of hearing this morning.

It fascinated me to discover how adroitly W. Grey Walter has walked the tightrope between vitalism and the ultimate in mechanistic philosophy. Indeed it brought to mind a scene from earlier years at the Hopkins. The ancient, medical amphitheatre was filled with students who had come to hear the famous and by that time aging biologist, Driesch. Introducing him was "Popsy" Welsh, no longer young himself, portly with his halo of white hair slipping down below his occiput to ring his bald pate, but with all feet firmly planted in the good earth of science. I can hear him growling a bit as he said, "Of course there is a tendency on the part of many to feel that when a scientist becomes a philosopher he must be verging on that inevitable fate which we call the senilium." Then with a quick look at the guest of the occasion he added hastily, "But of course we don't have any such feeling about our honored and famous guest." So I look at my friend; but no matter how carefully I scrutinize him I cannot find a trace of the senilium here: so I can say with Popsy Welsh that no such idea crossed my mind for a moment, as I contemplate our honored guest. And the fact stands that in his lecture he skirts the precipice of mysticism without once letting his foot slip; and I for one found it delightful to watch him do it.

There are more serious matters to be considered however: and many penetrating and imagination-stirring phrases.

I would call your attention to the distinc-

tion he draws between the classical method of science, which *depends upon the isolation of a single variable in large scale simple systems,* and the contrasting logic of contemporary physics, where the method of science has become the "*application of highly refined and abstract notions of probabilistic interactions between unidentifiable elements in complex microsystems.*" This throws a light on the essential challenge with which the effort to integrate neurophysiology and psychology confronts us; because in psychobiology, as he points out, we have large scale and complex systems, which are made up of heterogeneous and not homogeneous elements; and unlike the cells of the bloodstream they do not interact in parallel but freely, and with an almost infinite variety of interconnecting patterns. If one considers the *10,000 million neurones* in our nervous system, and the number of patterns in which their connections can be arranged, the possibilities become not only immeasurable but almost inconceivable, even by that superlatively equipped apparatus, the brain itself.

Then he points clearly to the basic scientific significance of psychoanalysis, seeing with extraordinary perspicacity that the essence of its technique derives from the laboratory rather than the clinic, and that its observational situation is so designed as to ensure that *information will flow predominantly from the complex system which is under scrutiny to the observer* and not in both directions simultaneously as happens in all other human interactions. It is highly significant that without sacrificing one legitimate skeptical doubt our gifted lecturer can characterize so clearly the essential position in science of psychoanalytic methodology. I might add that even among analysts there are not many who do so, and that he is one of the few among experimental physiologists who has this understanding.

Glider planes happen to be our lecturer's preferred method of personal transportation; and he uses them much as the cat in the fable used his seven-league boots. Thus his next great glide is to explain why models are the best means to close the body-mind gap. With words which are poetic in their economy and clarity, he points out the advantages of the model: that it is always and frankly an analogy, that it either stands or it breaks down, but that when it breaks it breaks clean. "They shear with a clean snap and do not yield and flow as words and phrases do." Never have I heard the ultimate difficulty of all psychologizing more pungently expressed. All psychologies depend uniquely upon words. Yet words are as treacherous as quicksand. They "yield and flow" when we put our weight on them, molded by our prejudicies and partisan feelings. And we are worse than Tweedle-Dum and Tweedle-Dee in Alice. We make them mean whatever we want them to mean, without even paying them extra. And this we cannot do with the model. Thus without laboring the point, he makes clear the basic technical philosophy that underlies the use of models in the effort to bridge the gap between physiology and psychology.

But then, unhappily and inevitably moments come when he too has to use words, and he illustrates the very treachery of words which he deplores. Thus when he describes what models have been able to do, he speaks of "goal-seeking behavior," "self-regulation and self-repair," "appreciation of optima," of "logical decision," "free choice between equally probable objectives"; the "identification of self," the "development of personality," the "formation of cooperative communities," the "modification of behavior by experience." Here I have to ask whether his words are not now flowing and yielding under his weight, whether these are actually identities or mere analogies, or at most a *spectrum of complexity;* and whether the spectrum exists with continuity or discontinuity still remains to be demonstrated. Surely it is not entirely an accident that it is precisely at this difficult point that the issue of *vitalism* rears its tempting and uneasy head.

I must ask some more questions. It is true, of course that he can make a machine, his "Machina docilis," that can learn certain things. It can select relevant information from random input, called "noise." It can store and classify this information and it can re-combine it into new combina-

tions. And the machine shows some individual idiosyncrasies.

But equally important are the things it *cannot* do. Is there any individual machine which can develop an obsessional work block, potentially capable of doing great things but capable none the less of dawdling? Can he make a machine that would fantasy action instead of action? Can he conversely make a machine with a repetitive and insatiable (*i.e.* compulsive) learning drive or a need incessantly to *do* instead of to fantasy?

Or let us take another step. Can he make a machine which would experience and even communicate something similar to elation if it succeeds, or to depression if it fails? Even more important can he make a machine which will react to failure with elation and with depression to success? Has he a machine which will play truant from school, substituting other forms of misbehavior like a juvenile delinquent or for that matter like a senile delinquent.

These are some of the limitations of the machine models; and they should be borne in mind even as we are impressed by their extraordinary versatility.

Then he swoops again, this time to the question of how to classify the subtle qualities and functions of which this extraordinary and almost infinitely complex machine is capable. Here his basic verbal tools are the concepts *versatility, imagery, stability, ductility,* out of which he must derive learning and memory and motivation and imagination and originality and *personality*. I must challenge him here again; because suddenly we meet another word which gives me pause. I have never been sure that there is such a thing as *personality*—not at least as a *Ding-an-Sich*. Is personality a quality, a function, an attribute which is *in* a person? Or is it an intuitive, highly colored (or *discolored*) impression *which exists only in the eye and mind of the beholder,* a different one in the mind of each beholder? A nice question this, when we stop to think of the reams of paper and ink and experimental work which have been devoted to efforts to define and measure something which may not even exist as such. Consider only the number of Ph.D. theses which have been written on this elusive topic! Perhaps it has eluded our search precisely because it is an abstraction, which has no more claim than a Unicorn to existence as a definable unit. William James pointed out many years ago that *Consciousness* is an abstraction and that it has no existence except as an abstraction from moments of a man being aware simultaneously of himself and also of himself being aware of something. The same may be true of personality.

Then comes another great leap, which carries our lecturer to one of the most important developments in the correlation between behavior and electrical studies of the activities of the brain, namely the establishing of a high correlation between the capacity of an individual for versatile behavior and high variants in brain rhythms. This leads him to consider the significance of this in relation to the amount of variety which is needed to recognize variety (Ashby), to communications theory, and then to a consideration of the fact that adaptive behavior is built out of conditioned reflexes superimposed upon unconditioned reflexes, *a process which is governed by statistical laws.* In this process he recognizes three essential stages: (a) the selection of relevance out of random input on "noise," (b) storage and classification of input bits, (c) the re-combination of stored data to form fresh psychological events. In essence this is the method by which the *central core of preconscious processing* is built into the psychophysiology of behavior. As we begin to grasp the full implications of this preconscious conditioning, we face a new understanding of the variety and detail of human experience. What Grey Walter outlines here provides a basis for understanding of (a) preconscious filtering of data, and (b) for preconscious conditioning built out of and around the unconditioned reflexes which arise directly out of the body's essential homeostatic and homeothermic biochemical and biophysical requirements.

The speaker then makes a passing reference to the data dependent upon afferent isolation. Here again he slips into verbal error, by using the currently accepted but fallacious term "sensory deprivation." The phenomena are afferent but not sensory;

and are dependent *not* upon deprivation (a word which begs the whole question of its mechanism) but upon *relative* isolation. No method has been devised by which the continuous inflow of preconscious enteroceptive afferents has been eliminated. The exteroceptive inflow can be eliminated and proprioceptive afferents reduced; but that is all. Secondly, we should not overlook the significance of sharply localized afferent reductions, as first emphasized by Cushing in World War I. Quite unwittingly Cushing showed that the tragedies of war gave experimental verification to Freud's basic observation on the role of sacral functions in behavior. Cushing observed that if a man is cut off from all afferents from the lumbosacral segments by a transection of the cord above the lumbosacral level, he becomes a philosopher and a model of resignation. This is a form of selective afferent isolation the significance of which must be kept in mind in the interpretation of all current experiments in this area.

The speaker next leads us to consider the role of the autonomic nervous system; and here he brings to us a direct report of his own experimental work with the galvanic skin reflexes (more particularly, alterations of skin resistance). He focuses on the duration of the latency period of conditioned as opposed to unconditioned galvanic skin reflexes, and shows that the latency periods for the unconditioned responses are always briefer than the latency period for conditioned responses. With this as a base, he describes a series of experiments on the spontaneous, unguided learning process (*i.e.*, learning specifically how to avoid an unpleasant stimulus). He shows how the learning curve varies from one individual to another, and how this variation correlates with a shift from unconditioned responses with brief latency periods to longer latency periods for the conditioned responses, until finally the avoidance response is so completely learned that the galvanic skin reflex itself is no longer evoked. Here again one sees clearly the role of preconscious functions in the wholly preconscious acquisition of autonomic responses.

Here we must consider further the data from experiments on human cerebral vitality. Of special relevance is the selective correspondence of intra-cerebral events with the patterns of external events, a correspondence which requires some process of selective filtering at a primary intake point, a "significance filter" or "relevance filter," as Grey Walter calls it. This implies a matching of signals from incoming "*gestalts*" to some pre-set pattern. This too is linked directly to instinctual behavior through the galvanic skin reflex. And here the emphasis on the skin is of even greater importance than Dr. Grey Walter takes time to point out. The skin is the boundary between each of us and the outside world, between the "I" and the "non-I" world. Moreover, distance receptors are mere extensions from the skin,—like the relation of wire-tapping to the unaided human ear. It is this which gives peculiar significance to his studies of variations in the latency of the galvanic skin reflexes of conditioned and unconditioned stimuli in the learning process.

It may however, be useful to emphasize the fact that all such conditioning, both autonomic and psycho-motor, the resultant intra-cerebral mechanisms for coding and sorting, the widely dispersed relays which insure attention, all of these operate not in the conscious symbolic system nor in the system of distorted or "unconscious" symbolic processing (in the psychoanalytic sense) but on the preconscious level. This gives to preconscious processing a dominant significance in human mental life.

Ultimately, if the machine model is to become a more adequate diagram of human mental equipment, it must provide us with a facsimile of 3 basic modes of mental functioning:

(a) The vast majority of its action must take place on a level which is equivalent to preconscious processing. It is mainly on this level that *unconditional* responses occur to specific stimuli, with diffuse transmission to hypo-thalamic autonomic pathways for homeostatic and homeothermic controls; and it is in the same preconscious system that conditioned responses with longer latencies lead to less sterotyped patterns. For it is on this level that we estab-

lish conditioned reflexes to novel or neutral stimuli which have been linked to the unconditioned stimulis. Therefore, it is this which provides the initial diffuse searching and the gradual orientation which leads to adaptation. It is this multiple inflow and outflow, including the autonomic, which constitutes the raw material of the learning process.

Finally, it is on this level that input patterns are matched with pre-learned configurations.

All of this occurs through preconscious processing, based on unconditioned and conditional reflexes. This then is the core of what the machine model must in some measure set out to duplicate.

(b) The next step however, is even more difficult. Superimposed on the preconscious process is a symbolic system which samples the preconscious stream. This must also include self-sampling, if it is to be a true analogy to human symbolic behavior. Moreover the sampling process feeds bits of information data back into the preconscious stream through fresh conditioned reflexes. This also must be matched by the machine model.

(c) Finally, the machine model must reproduce in some measure that distortion of the sampling and self-sampling system, which in human affairs we call "unconscious." To reproduce all three of these ingredients would be the ultimate goal of the machine model.

INFORMATION INPUT OVERLOAD AND PSYCHOPATHOLOGY[1]

JAMES G. MILLER, M.D., Ph.D.[2, 3]

It is a commonplace that variations in rates of input of energy or matter to the nervous system can result in pathological behavior, even complete breakdown in function and death. This is true both of lacks of energy or matter input, such as cerebral hypoglycemia and generalized starvation, and also excesses of energy or matter input, such as heat stroke and magnesium poisoning. So there can be energy or matter input underloads and overloads to the brain.

In the last decade increasing attention has been devoted by physical, biological, and social scientists to the effects of alterations of rates of information input into systems, independent of changes in energy or matter flows. We use "information" in the currently accepted technical sense and are concerned not with the value of the information, but rather with the quantity of it. When measuring amounts of information, our units, according to current convention, will be binary digits or bits. The present view of information theory is that signals are complexes of data transmitted from one physical system to another, conveying information only if they could not be predicted from data previously available to the receiving system. As Jackson says(5):

> Incomplete knowledge of the future, and also of the past of the transmitter from which the future might be constructed, is at the very basis of the concept of information. On the other hand, complete ignorance also precludes communication; a common language is required, that is to say an agreement between the transmitter and the receiver regarding the elements used in the communication process. . . . The information of a message can be defined as the "minimum number of binary decisions which enable the receiver to reconstruct the message, on the basis of the data already available to him." These data comprise both the convention regarding the symbols and the language used, and the knowledge available at the moment when the message started.

INFORMATION INPUT UNDERLOAD

In the last few years there have been a number of experimental studies suggesting that pathological function of the nervous system and abnormal behavior can result from information input underload, often referred to as "sensory deprivation." Spitz (14) and Fischer(1) have held that the stimulation from the interaction between an infant with its mother, particularly in the third to sixth months of infancy, is necessary for normal mental development. Studying single children and small groups in institutions, they have contended that the effects of "hospitalism" in situations where maternal stimulation is lacking may lead to severe mental retardation. As yet, this question has not been studied with appropriate controls. Several rigorous experiments with animals on related issues, however, have been carried out. For instance Riesen(13) found that if he raised a chimpanzee in complete darkness for the first 3 months of life and then brought it into light, it would never be able afterward to see perfectly. Apparently some sort of information input or sensory stimulation was necessary during the first 3 months for the visual nervous system to develop properly. On the other hand, a chimpanzee raised in light for the first 3 months and then kept in darkness for as much as 6 months, when returned to light, had temporary difficulty seeing, which quickly cleared up. The first few months appeared to be the critical period of need for visual inputs. Thompson and Heron(15) found

[1] Read at the 115th annual meeting of the American Psychiatric Association, Philadelphia, Pa., Apr. 27-May 1, 1959.

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[3] The author wishes to express his indebtedness to all his associates at the Mental Health Research Institute, whose continual discussions provided the substrate on which this research grew, and especially to Donald Marquis, Richard Meier, William Horvath, Caxton Foster, Arnold Horowitz, Donald Maynard, Kent Marquis, Lillian Kelly, Tom Mahs, Paul Halick, Merrill Jackson, Leonard Uhr, and Thomas Law. This research was supported in part by Department of the Army Contract DA-36-039-sc-78801 and by United States Public Health Service Grant MY-1871.

that puppies reared with restricted sensory and perceptual experiences showed more active exploratory behavior than normal in later life. This fits in with the fact (cf. 12) that the genitalia of infant rats must be licked by their mothers or be stroked lightly by a human caretaker with a pledget of cotton to elicit urination or defecation. This is not a mechanical effect of the mother's tongue or the cotton, but is mediated through sense receptors on the rat's skin. Also Meier and Stuart(9) have shown in a controlled study that handling and fondling kittens will speed up the normal maturational fur color change.

A good deal of attention has been given to the sensory deprivation work of Heron, Doane, and Scott(4) in Hebb's laboratories, of Lilly(8), and of others. These investigators have reported that diminishing the normal rate of sensory input to human subjects, either in closed booths or submerged under water with eyes and ears covered and a breathing tube to the surface, in a few hours produces delusions, illusions, hallucinations, and other abnormal psychic phenomena in some ways like psychotic states.

From all these human and animal investigations it appears that the organism must receive a certain rate of flow of sensory information for normal development, particularly in infancy, and also for the maintenance of adjustment throughout life. If information input underload occurs, pathological behavior and perhaps permanent structural change result.

ANECDOTES ON INFORMATION OVERLOAD

In our present research we are asking whether the reverse condition, information input overload, can also produce psychopathology. This seems reasonable, since both energy underload and energy overload can disturb organisms. We have not discovered any publications giving clear-cut indication of this. There are, of course, suggestive anecdotes. It is not only in novels and motion pictures that corporation executives, under prolonged daily pressure to make many rapid-fire decisions, break down. The speedy aging of America's presidents, largely from the rush of their life and the continual weight of decisions, has been noted. The pressure on generals in wartime often has comparable effects.

Perhaps the many blatant and competing sources of information—radio, television, movies, magazines, and newspapers—contribute to the increased tension said to characterize our age. In the moving pictures a person breaking down emotionally is depicted as seeing whirling bright lights coming toward him, loud noises, and other information overloads, as if this were the subjective experience of patients in this plight. But this is anecdote, not controlled experimentation. Is it possible to determine rigorously the effects of information input overload?

GENERALIZATIONS ABOUT FIVE LEVELS OF SYSTEMS

The preliminary studies which we shall report here are directed to this question. They are conducted in the conceptual framework of the general behavior systems theory being developed by our research group(10). We are concerned with individuals, but also we wish to discover whether there are measurable similarities in the functions of various levels of behaving systems. We are equally interested in systematic differences across these levels. So we have undertaken to investigate the effects of information input overloads on 5 levels of behaving systems: The cell (the neurone), which is a subsystem of the organ (the brain), which is a subsystem of the individual, who is a subsystem of the small face-to-face group, which is a subsystem of the larger social institution. Our research, therefore, comprises 5 separate, concurrent studies with similar research designs, at the levels of cell, organ, individual, group, and social institution.

Three aspects of behaving systems can be studied in relation to information input overload. The first is their *performance* when viewed as channels transmitting information; that is, the relation between the input of information into the system and its output. The second is the *mechanisms of defense or adjustment* of the system to the stress of information input overload. And the third is the *costs*.

Concerning performance, we have concluded from a literature survey that if in-

put in bits per second is plotted on the abscissa against output in the same units on the ordinate, output will rise as a linear function of input up to a certain point, leveling out at a channel capacity which cannot be exceeded, remaining at that level for a period. It will probably then decrease swiftly, the amount of information being put out actually decreasing in a "confusional state" as the input rate continues to increase. This represents a final collapse of this function of the system.

In our literature search we tried to discover all the mechanisms of adjustment used by systems to handle information overloads. We identified a number, each of which in some way helps with the problem, but each of which also has a cost in some sort of decreased efficiency of information transmission. Not all systems have all these mechanisms of adjustment available to them. In general it seems that the larger and more complex systems have more of them, which is understandable because they have more specialized subsystems, whose functions are to provide such mechanisms. Those which we have identified are: (a) omission–temporary nonprocessing of information; (b) error–processing incorrect information, which may enable the system to return to normal processing afterwards; (c) queuing–delaying the response during a period of high overlap of input information in the expectation that it may be possible to catch up during a lull; (d) filtering–neglecting to process certain categories of information while processing others; (e) cutting categories of discrimination–responding in a general way to the input, but with less precision than would be done at lower rates, *i.e.*, instead of reporting "I see yellow," saying "I see a light color" or "I see a color"; (f) employing multiple channels –processing information through two or more parallel channels at the same time; decentralization is a special case of this; and (g) escape from the task.

These mechanisms of adjustment do not sound like the classic mechanisms of defense of Anna Freud, but they may overlap somewhat. For example, the mechanism of isolation may be like omission and flight from reality may be like escape from the task.

Costs of information transmission may be quantified variously. One may measure the amount of energy required by the system to transmit an average bit of information; the amount of some other scarcity required to transmit an average bit; the amount stressful overload shortens the duration of survival of the system or organism; and even perhaps the effects in altering the probability of risks taken by the system in making decisions critical to its continuing existence.

In general we conclude from our literature studies that the cost per bit of information flow at very high rates is probably much greater than at low rates, rising precipitously at the confusion period as the system begins to break down. However, the empirical measurement in comparable units of costs of information flow across the various levels of systems is difficult and we have not yet undertaken such studies. We mention them simply as possible future researches and shall now turn to the details of measurements of performance and mechanisms of defense at the various levels of systems.

DATA ON THE CELL

It is possible to overload a cell specialized for the transmission of information–a neurone–by increasing the rate of input of electrical impulses to it until finally its transmission breaks down. This is not an energy overload, and is rapidly reversible. A review of relevant articles indicates that there is as yet no agreement as to how neurones code information, whether amplitude modulation, frequency modulation, pulse duration modulation, or some other method is employed. We therefore cannot make a direct translation from neural impulses per second to bits per second. However, if we were to make the not-too-unreasonable first-order assumption that there is a correlation of some sort between the number of impulses and the number of bits per second, input-output performance curves of neurones in units of impulses per second may be assumed to have a similar shape to curves calculated in bits per second. In many neurophysiological studies

the rates of stimulation of cells were altered and the outputs measured electronically. For example, Granit and Phillips(3) reported concerning the responses of a Purkinje cell of the cerebellum that its output rate followed the input rate up to about 180 impulses per second, but when stimulated at a faster rate (280 impulses per second), its output fell to 30 a second.

THE ORGAN SYSTEM

Input-output performance characteristics of total organ systems have also been studied, the units in such researches also being impulses rather than bits per second. Function of the complete visual tract, an entire organ system, was investigated, for instance, by Jung and Baumgartner(6). They made microelectrode recordings from the optical cortex in cats being stimulated by light impulses of constant duration but various rates of flicker. Concerning what they called "B-type" reactions in the optical cortex, they made the following findings: the discharge rate increased from about 22 per second when 4 flashes per second were given to the cat, up to a maximum of about 25 per second when 7 flashes per second were administered. On further increase of flash frequency the rate of impulses diminished, so that at 10 flashes per second it was 18; at 18 flashes per second it was 15; and at 50 flashes per second it was 6.

THE INDIVIDUAL

Quastler and Wulff(11) investigated piano playing as an example of information transmission by individuals. Random music, constructed from a table of random numbers, was played by 3 young pianists who were excellent sight readers. After practice with this sort of music, the subjects estimated the highest rate at which they could play the music at sight. This rate was set on an electric metronome, and the first test piece presented. Successive numbers were then presented at gradually increasing speeds, up to a rate which was obviously well beyond their capabilities. All performances were recorded on tape and timed with a stopwatch. The errors in the different performances were scored by listening to the tapes. From these errors plus knowledge of the amount of music played in a given time, rates of information transmission were calculated.

The results of these tests were as follows: The pianists made few errors up to a speed of about 5.2 keys per second. Thereafter as speed increased, precision was sacrificed and the error rate increased so that both the transmission rate per second and the number of correct keys per second remained approximately constant. Then the proportional trading of speed for precision went on until a second critical point was reached, which was the highest useful speed, about 10 keys per second. Beyond this rate the quality of performance deteriorated rapidly, as a result of confusion. The peak transmission rates were between 10 and 14 bits a second when 3 to 5 keys of the piano were used; 16 bits a second with 9 keys; 19 bits a second with 15 keys; 23 bits a second with 25 keys; and 22 bits a second with 37 keys. When the range was extended to 65 keys, a few errors occurred even at low speeds, and the transmission rate peaked at only about 17 bits a second, because frequent jumps had to be made between distant keys. There were individual differences among the subjects in the mechanisms of adjustment to information input overload. One sacrificed speed but minimized errors; another kept closer to the established speed than the others, though with more errors.

THE GROUP

At the group level Lanzetta and Roby(7) conducted an experiment with sets of 3 subjects seated in separate booths, communicating by an interphone circuit through which, by depressing a hand switch, any subject could speak simultaneously with both other subjects. In each booth were 2 switches, each with one "off" and 3 "on" positions. There were also printed operating instructions in the booth. A slide projector threw pictures of 2 simulated aircraft instruments on the front wall of each booth. The subjects were required to relay information presented to them by instrument readings to the proper booth and to execute control actions with their switches, based on relayed or directly available instrument readings. The settings

of the instruments were automatically recorded.

The rate of presentation of the slides was altered and other changes were also made in the situation. Average group error increased as the rate of information transmission in bits per minute increased. The maximum rate of information transmission in these groups was 12.64 bits per minute.

THE SOCIAL INSTITUTION

Data concerning information input overload in social institutions are rare, but Fritz and Grier(2) have studied information flow in human organizations larger than groups in direct contact, specifically the conversations between pilots and control tower operators during landings at an Air Force training base. In this situation the upper limit of transmission observed was about two bits per second, by their perhaps questionable calculations, and there was evidence that above such a rate overloading could occur.

The various researches reviewed indicated that at different levels a number of the mechanisms of adjustment mentioned above are employed, including omissions, errors, queuing, and filtering.

It appears that channel capacities *per channel* are less the larger the system. This is a regular, hierarchical difference, proceeding from a maximum of several hundred impulses (or bits) per second at the level of the neurone, to perhaps 200 at the organ system, to about 30 for the individual, to a good deal less for the group and the social institution, although these last values are less certain. While it is not entirely obvious from the literature at present, it does make sense that the more components there are in a channel, the more opportunities there are for loss of information at junctions between subsystems. Also, no such channel is faster than its slowest component. Of course large systems have many more parallel channels than small systems, so that they can handle more information overall, even though the average channel capacity is lower because the average channel is longer and has more subsystems.

OUR CURRENT EXPERIMENTS

An interdisciplinary team in our Institute is now collecting data on performance of systems at 5 levels under information input overload. For neurones we are trying to determine the method of information coding by a sort of cryptographic analysis. We plan to make a contingency table, plotting various sorts of inputs to neurones against their respective outputs, hopeful of learning by analysis of that table what code or codes are used. We have built an apparatus capable of stimulating neurones at various rates, with various degrees of regularity or randomness, and at various intensities. We are studying individual fibers in frog nerves, recording outputs from microelectrodes.

At the level of the organ we plan to study the visual nervous system of the cat, stimulating the retina electrically and photically with our apparatus and recording outputs through electrodes implanted on the optic nerve, the lateral geniculate, the superior colliculus, and the calcarine fissure area of the cortex. In these cell and organ level studies we expect to find performance curves rising to channel capacity, levelling out, and eventually breaking downward as input rates increase. Further, we expect to find in the cell the mechanisms of adjustment of omission and error (that is, stimuli not strong enough to fire the next neurone in a chain). Queuing may well also exist. The neural threshold constitutes a type of filtering. Whether other mechanisms of adjustment will be found is uncertain, but at the level of the organ, of course, multiple channels also exist.

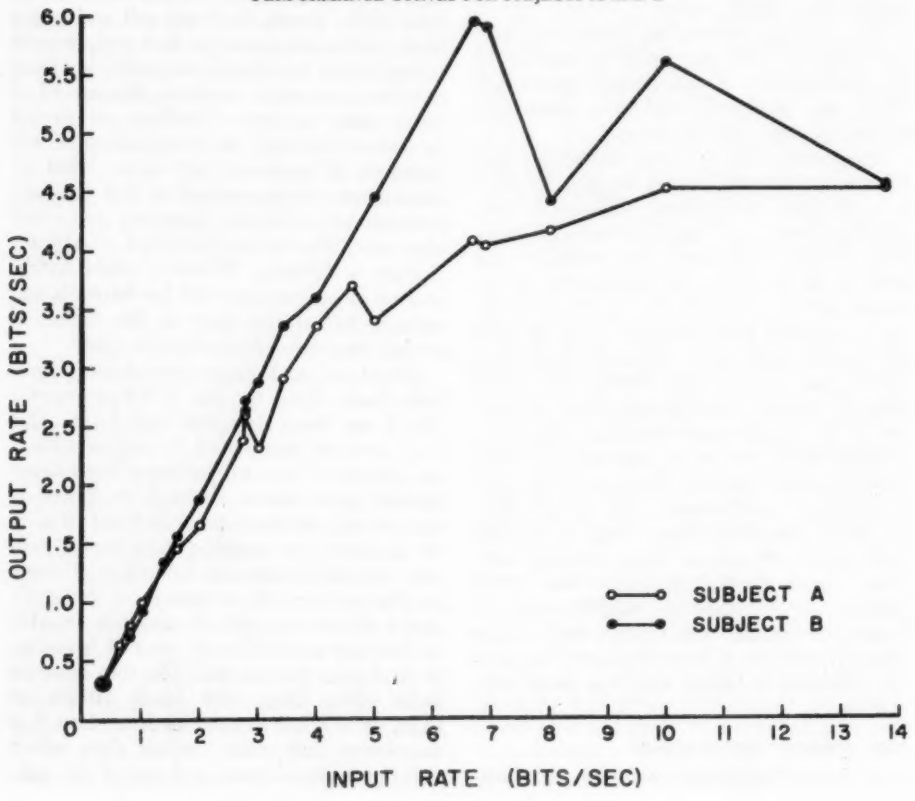
Individual and group experiments have both been done on the IOTA apparatus which we have designed and built. This is a piece of equipment by which stimuli are presented to a subject on a transparent ground glass screen about 3 by 4 feet in size, which sits on a table in front of him. He responds by pushing appropriate buttons arrayed before him. Stimuli are thrown on the back of the screen by a Perceptoscope, which is a sort of projector capable of showing movie film at rates of from one to 24 frames per second. The film contains little white dials with black arrows on them, which can appear in from 1 to 8 of the 8 two-inch wide vertical slots which run down the screen in front of the sub-

ject. Arrows can assume any one of 8 angular positions, like clock hands. Before the subject is a set of 8 buttons for each of the slots being used. Since he can see stimuli in a maximum of 8 slots at once, altogether he has 64 buttons, 8 sets of 8 buttons each. If an arrow in Position b appears in Slot 3, the correct response is to push Button b of the set for Slot 3. Any other response is an error. If the subject pushes none, that is an omission.

Queuing is also possible. The subject has a foot pedal by which he can lower or raise opaque strips behind each of the slots. At the beginning of each test only the top square in each of the slots being used is open so that light can come through. However, if the subject pushes his pedal, he can move the opaque strips to open up to 11 more squares, a maximum of 12. By pushing the pedal in the other direction he can close these up again, as he wishes. The moving picture film is so made that if an arrow appears in Position b in Slot 3 in Frame 1 of the film, it goes to the next lower position in that slot in Frame 2, and to the next lower in Frame 3, until it has gone through all 12 positions and finally disappears from the screen. In the meantime other stimuli may be appearing higher in the same slot or in others. When the subject pushes his queuing pedal, he therefore gives himself more time to respond to the stimulus before it disappears. He can filter by paying attention only to the arrows pointing up or to those pointing to the left, rather than to all 8 positions. He can cut categories of discrimination by

FIGURE 1

PERFORMANCE CURVES FOR SUBJECTS A AND B



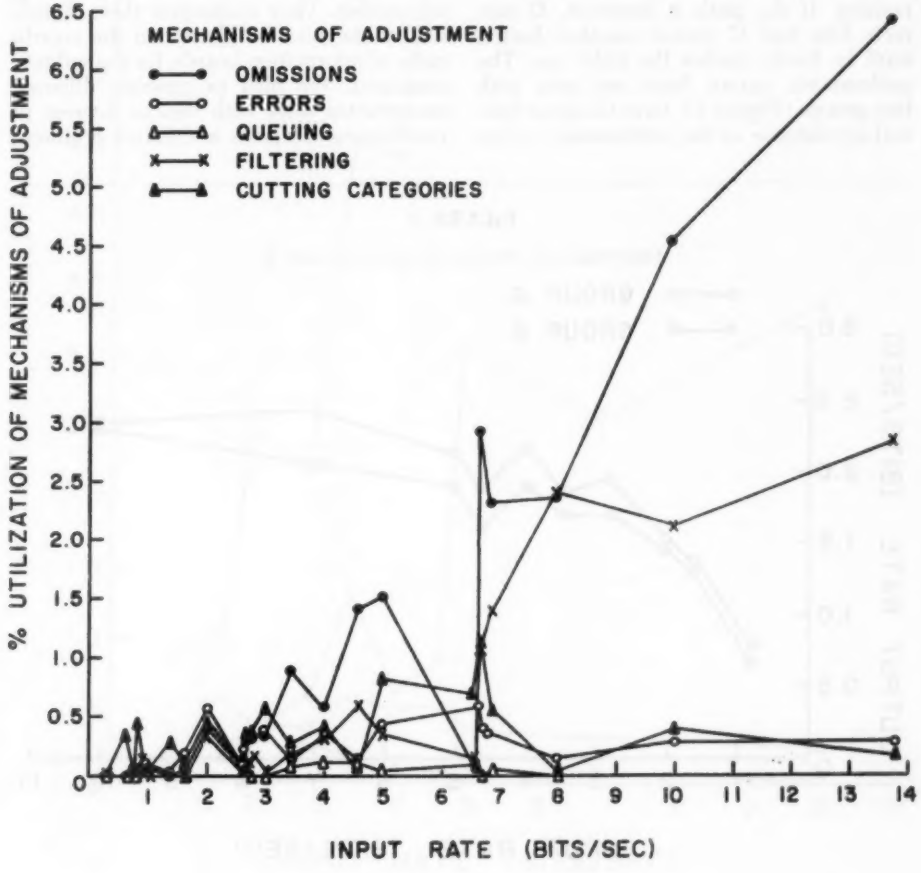
pushing all 4 left buttons in Slot 3 if he is not sure exactly in which of the 4 left directions the arrow pointed, but knows it pointed toward the left, or by pushing all 8 buttons for Slot 3 if he simply saw an arrow but has no idea as to its direction. On occasion he can use multiple channels by working with both hands at the same time. Finally escape is possible, if he gives up and refuses to continue the task. So all the mechanisms of adjustment we have mentioned are possible on the IOTA.

This apparatus can increase in several ways the amount of information per second being processed : by speeding the rate ; by increasing from 2 to 8 the number of alternate positions for the arrows ; by raising the number of slots used simultaneously ; or by altering the degree of regularity or randomness of the presentations.

We have run experiments on this equipment with trained individual subjects. Performance curves for two subjects are seen in Figure 1. There are individual differences, but the curves have similar forms, rising to a channel capacity between 4.5 and 6 bits a second and then perhaps falling off, though our data so far do not

FIGURE 2

MEAN UTILIZATION OF MECHANISMS OF ADJUSTMENT BY BOTH SUBJECTS AT VARIOUS INPUT RATES



make us certain this fall occurs. All mechanisms of adjustment mentioned above except multiple channels and escape were used by these subjects, as indicated in Figure 2. In general the use of these mechanisms—especially omissions and filtering—increased as the loads increased.

We have also begun to use the IOTA apparatus with groups. In this situation 3 members of the group, A, B, and D, face the screen. A calls out the slot in which an arrow appears, and B calls out a letter representing the position. C, whose back is turned to the screen but who is facing the buttons, then pushes a button in terms of the information he got from A and B. When C pushes a button a small red light in one of 8 positions lights up over one of the slots, indicating which button he pushed. If his push is correct, D says nothing. If the push is incorrect, D corrects him and C pushes another button until he finally pushes the right one. The performance curves from our runs with two groups (Figure 3), have the same general appearance as the performance curves of the individual subjects, though at lower channel capacities between 2 and 2.5 bits per second. Also the use of mechanisms of adjustment (Figure 4) was comparable, although it happened that queuing was not employed. Group system organization involves new and interesting problems related to the various roles of its members and the effects of their intercommunication channels on the group performance.

Finally a comment on the level of the social institution. We are arranging to do research in the next few months on the overloading of a simulator developed for training and research on the operation of our national air raid warning system. In this simulator, groups of individuals in separate rooms receive information automatically, concerning planes flying in the particular air spaces for which they are responsible. They reinterpret these signals so that they can be plotted on the coordinates of information boards, for the military command. We plan to generate different presentation rates with various degrees of randomness of signals in different positions,

FIGURE 3

PERFORMANCE CURVES FOR GROUPS A AND B

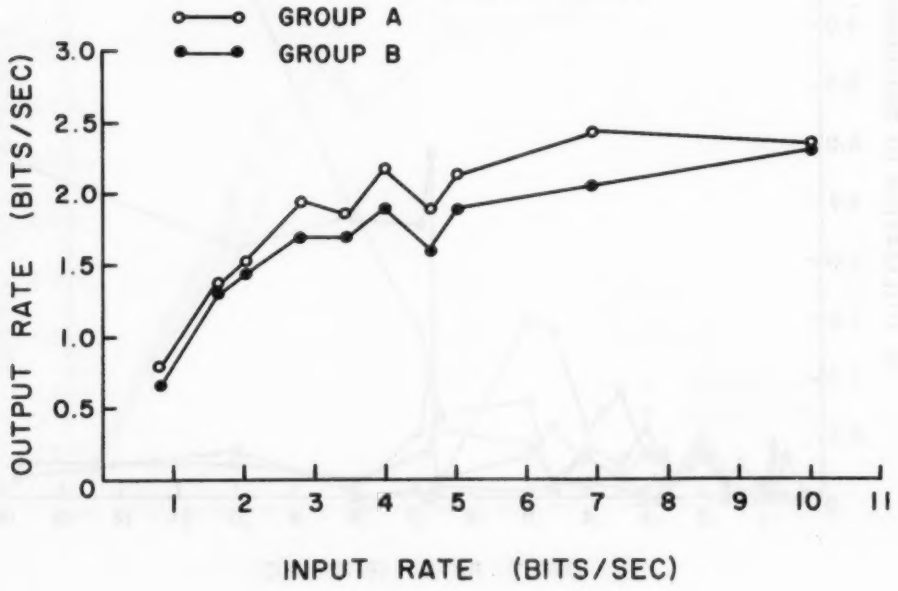
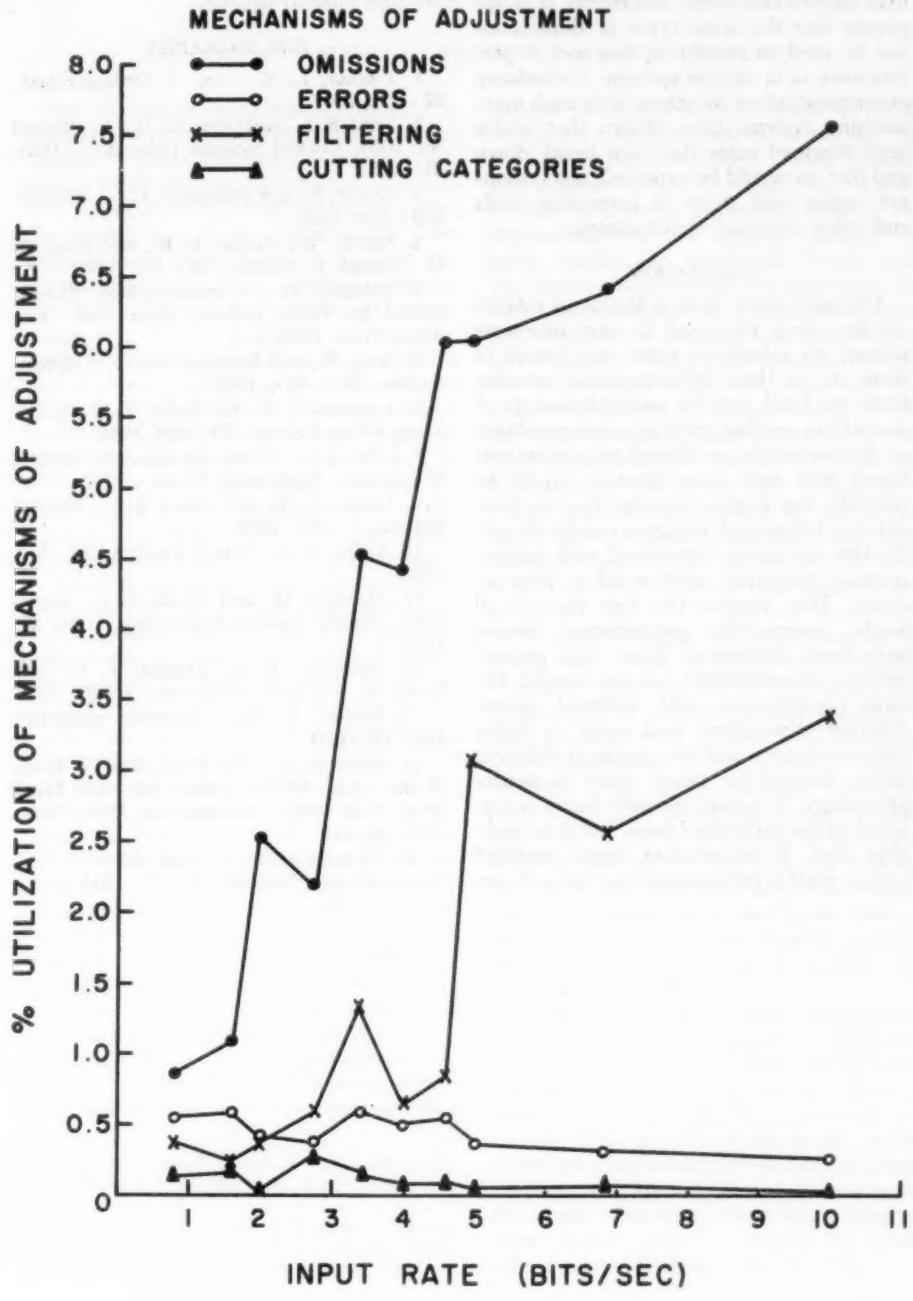


FIGURE 4

MEAN UTILIZATION OF MECHANISMS OF ADJUSTMENT BY BOTH GROUPS AT VARIOUS INPUT RATES



and to discover the performance characteristics, channel capacity, and mechanisms of adjustment of this heirarchical, larger than face-to-face social institution. It is apparent that the same types of dimensions can be used in measuring this sort of performance as in smaller systems. Preliminary experiments done by others with such man-machine systems have shown that under high overload rates they can break down and that, as would be expected, the systems are under real stress in saturation raids and other overload circumstances.

Conclusion

Although more than a thousand related articles were reviewed in our literature survey, no references were ever found in them or in their bibliographies crossing from one level, say the neurophysiology of the cell, to another, such as group psychology. In one article an offhand suggestion was found that such generalization might be possible, but it was apparent that in present-day behavioral science cross-level similarities are rarely considered and general systems properties seldom taken into account. This, despite the fact that at all levels comparable performance curves have been discovered. Since such general systems characteristics are not sought, the same phenomenon, with different names, different dimensions and units, is being discovered over and over again at different levels. Known for many years in neurophysiology, it is only recently being recognized at the individual level. Yet it is probable that, if information input overload causes similar performance curves and mobilization of comparable defenses at all levels of behaving systems, it can explain some of the psychopathology of everyday life and clinical practice.

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BRAIN DAMAGE FROM CHRONIC ALCOHOLISM: THE DIAGNOSIS OF INTERMEDIATE STAGE OF ALCOHOLIC BRAIN DISEASE [1]

A. E. BENNETT, M.D.[2], G. L. MOWERY, AND JOEL T. FORT, M.D.

Our studies of hundreds of patients in the past 7 or 8 years point to the rising incidence of acute and chronic stages of alcoholic brain disease; and to the existence of a midway stage, which we have called the intermediate brain syndrome(1). Our findings about these stages, particularly the intermediate one, have implications for practical treatment and a preventive program.

Pathologic drinking, chronic alcoholism and alcoholic addiction have become a major national problem. "From a public health standpoint," Maurer and Vogel(2) state, "probably the most important drug of addiction in the United States is alcohol." Bowman(3) raises the question why, out of some 70 million persons who use alcohol without undue harm, some 5 million use it at times to excess and about a million of them are alcohol addicts. He concludes that existing knowledge and tools must be used to the utmost, until research yields more adequate data regarding causes of alcoholism and methods of treatment.

Statistics show that organic brain disease in alcoholic patients is increasing. The first admission rate of alcoholics with psychosis to California state mental hospitals increased from 5.9 in 1940 to 7.5 in 1953 per 100,000 civilian population. This increase in alcoholic brain disease has partly replaced the incidence of syphilitic meningoencephalitis, which in the same period dropped from 7.5 to 1.5 per 100,000 population. In 1953 the first admission rate of alcoholics with or without psychosis, 34.3, almost equaled that for patients with schizophrenia, 36.2 per 100,000 population.

Many persons still find it hard to understand that alcoholism is a disease; and that alcohol addiction is an advanced stage which may lead to such other serious diseases as hepatic, metabolic, renal, cardiac and organic brain diseases. The organic factors in chronic alcoholism tend to be overlooked, and the neglect accounts for many failures in treatment. These facts are sometimes ignored in the literature. For example, Alcoholism as a Medical Problem (4), a report of a recent conference sponsored by two New York medical groups, has no mention of the incidence and importance of alcoholic brain disease. A few investigators have called attention to this neglect. Lemere(5) points out that the habit-forming properties of alcohol have been insufficiently stressed in the literature; and that most alcoholics may drink for years "before they gradually and insidiously slip over into uncontrolled pathologic drinking." The loss of control he ascribes to "physical changes that take place in the brain after years of heavy drinking"(6).

In our experience in the psychiatric department of a private general hospital, a large proportion of patients have been admitted because of chronic alcoholism, many of them with serious physical complications. Alcoholic brain disease is usually classified as: (a) acute alcoholic brain syndrome, acute intoxication, delirium tremens and acute hallucinosis—a reversible stage; and (b) chronic brain syndrome, cortical atrophy and midbrain involvement, organic dementia or Korsakoff's or Wernicke's disease—an irreversible stage.

In the past 6 years about 750 patients were admitted for alcoholism to the psychiatric department. Electroencephalographic studies showed that in about a third of these patients the persistently abnormal EEG pattern would finally return to normal after months of sobriety. Cortical cerebral atrophy was present in most cases of chronic alcoholism. From these observations it was decided to extend the study over a comprehensive series of cases.

[1] Read at the annual meeting of The Society of Biological Psychiatry, Atlantic City, N. J., June 13-14, 1959.

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ELECTROENCEPHALOGRAPHIC STUDIES IN 227 CASES OF ALCOHOLISM

Electroencephalographic findings were persistent mild generalized 15-30 and 4-7 per second activity, at times with paroxysmal slowing and spiking. Fast activity parallels the acute clinical course of alcoholism and can improve. Persistent fast activity with slow activity spike discharges indicates organic brain pathology. These persistent abnormal EEG tracings are a valuable early diagnostic sign of organic brain disease. In some cases they precede the clinical symptoms of organicity.

Incidence of abnormality in 227 case studies: 78 cases with repeat EEG records: 36%; 25 cases with psychological tests: 11%; 12 cases with pneumoencephalograms: 5%.

1. *Acute stage, 98 cases:* Thirty-seven (37%) had abnormal EEG records, reversed to normal; 8 cases had psychological testing, 3 with evidence of organicity; 53 cases had normal EEG records.

2. *Intermediate stage, 81 cases:* Sixty-four (79%) had abnormal EEG records, usually reversed to normal slowly; 5 cases out of 6 psychological tests showed organic brain damage; 4 cases had pneumoencephalograms 3 of which showed cerebral atrophy; 17 cases had normal EEG records.

3. *Chronic stage, 48 cases:* Thirty-eight (79%) had abnormal EEG records; 11 cases had psychological tests: all showed evidence of organic brain damage; 8 cases had pneumoencephalograms: 7 showed cerebral atrophy; 10 cases had normal EEG records.

78 cases with repeat electorencephalograms

	Acute 15 Cases	*Intermediate* 39 Cases	*Chronic* 24 Cases
Unchanged	2%	14%	14%
Decreased abnormality	13%	21%	6%
Increased abnormality	0%	4%	4%

CLINICAL OBSERVATIONS OF INTERMEDIATE STAGE OF BRAIN DAMAGE

Personality changes: These show such symptoms as a rationalization of drinking, pathologic lying, infantile behavior, poor judgment, hostility, emotional lability, defiance, denial of illness, lack of insight.

Drinking pattern: It is an addictive, dependent or compulsive drinking, usually with daytime and solitary drinking.

Physiological reactions: These include blackouts, withdrawal reactions, severe hangovers. There are deliriod or convulsive episodes in about 50% of cases, and systemic complications such as fatty liver, cirrhosis, polyneuritis.

Psychological test findings: The main ones are perceptual (visual) organization defect; intellectual and personality deterioration; and impaired abstraction.

A recent French report by Lafon and coworkers(7) of 100 cases of chronic alcoholism confirms our findings. The pneumoencephalographic studies showed cerebral atrophy in 78 (78%) cases; the atrophy often pronounced, was usually diffuse, and was cortical in 8%, subcortical in 44% and corticosubcortical in 48%. The degree of atrophy did not correlate strictly with the clinical manifestations. This frequency in chronic alcoholism suggests a causal link. The EEG was abnormal in 80 patients, normal in 20. In 58 (58%) patients the pneumograms and EEGs could be definitely correlated, principally in cases of long-standing alcoholism. In the 42% with discordant findings the radiologic findings were often significant while the EEGs were within normal limits.

Clinical symptoms: This phase of alcoholism is hard to determine accurately from only the clinical picture. The patient's drinking pattern often may indicate early alcoholic brain disease. He requires a morning drink to control his withdrawal symptoms and to keep on at work. His appetite may be poor and he does not eat enough, so that the nutritional imbalance is aggravated and avitaminosis may become a cause of progressive cortical atrophy. Fatty liver changes are common. He has now lost control over alcohol.

A significant early clinical sign is the appearance of blackouts or temporary periods of amnesia about happenings in the drinking episodes. The patient may resort to other addictive drugs to help allay his fears and tensions. Possibly within a year or two after the development of recurrent blackouts, brain damage will begin.

As the benders become more frequent, the patient drinks to relieve symptoms of

former bouts and cannot stop drinking even when he tries to. At this stage, changes in cerebral functions have usually begun and there is progressive impairment of frontal lobe brain functioning. The patient's increased dependency on alcohol and his inability to control drinking force him into intricate rationalizations, excuses and lies which are aptly termed "alcoholic thinking" by Alcoholics Anonymous. The drinking pattern is compulsive, with solitary and daytime drinking. Poor judgment, emotional lability, infantile behavior, hostility, defiance and denial of illness, with almost complete lack of insight, make up the clinical picture. Too often these symptoms are ascribed to the sociopathic personality of the patient, whereas they are caused by the chronic toxic effects of the addictive drug ethyl alcohol, and are organic symptoms of brain damage.

The concept of alcoholism: The clinical picture, therefore, consists of two factors: the underlying, addiction-prone personality and the alcohol pathology. The two factors are not easily separated in a given case. After an acute episode the underlying personality disorder tends to be emphasized and the incipient stage of brain syndrome to be unnoticed.

Korsakoff's psychosis or Wernicke's disease forms the classic symptoms of chronic brain syndrome. There is hemorrhage or other degenerative processes in the midbrain, due mainly to nutritional deficiency. Pathology is also usually found in the cortex, because alcohol by its narcotic and anoxic effect on nerve tissues leads to cell death and cerebral atrophy. Courville(8) recently called attention to these pathologic effects:

> One of the more common noteworthy effects of repeated alcoholic episodes or of chronic alcoholism from constant excessive drinking is a progressive atrophy of the cortex of the frontal lobes. The change affects specifically the convolutions of the dorsolateral surface of these lobes. This relation to chronic alcoholism seems to be one resulting from the toxic effects of ethanol rather than malnutrition (avitaminosis).

He calls such chronic alcoholism

> the most common cause of cerebral cortical atrophy in the fifth and sixth decades of life. It may appear as early as the first few years of the fourth decade, particularly in individuals who have presented signs of a psychotic trend.

A report by Tumarkin and coworkers(9) discusses the lack of correlation between clinical and laboratory signs. Though without gross pathologic findings, 7 chronic alcoholic male patients showed brain damage and significant intellectual impairment, according to abnormal EEG records with bilateral, high-amplitude slow waves (3-4 per sec.) in the frontal and some parieto-occipital areas. Certain Wechsler-Bellevue subtests also indicated brain damage and significant intellectual impairment.

These data point to the thesis of a chronic brain syndrome of cortical pathology. Courville's comment of "individuals who have presented signs of a psychotic trend" accords with our observation that those patients suffering from cortical pathology do not show overt signs of organic psychosis, but rather an accentuation and exaggeration, to psychotic extent, of the preexisting personality disturbance. Therefore the true nature of this state escapes the attention of many physicians, including psychiatrists, and at the same time helps to explain why so many chronic alcoholics do not respond to psychotherapy.

The theory, however, that persistent abnormal EEGs indicate the presence of organic brain pathology does not mean, conversely, that all organic brain pathology is accompanied by abnormal EEGs. In some cases of Korsakoff's psychosis, for example, the abnormal EEG can improve to normal despite the remaining organic pathology. A similar condition was seen in some advanced cases of paretic dementia (10).

Diagnosis of stages—the value of electroencephalography: As already noted, the differentiation of stages of the syndrome depends on a careful study of laboratory, clinical and psychological findings(11). Early in our observations we found that in patients who had been hospitalized because of an acute brain syndrome the followup EEG records showed various differences. In some cases the EEG quickly returned to normal while in others it remained abnormal. Abnormal EEGs, how-

ever, could not be equated with cortical pathology. Only when the patient's mental symptoms of acute intoxication related mainly to cortical functions and when the abnormal EEG record persisted after the acute episode, did the combined findings point to the chronic cortical pathology. Moreover, as reported by Lafon, in 58 of 100 cases with pneumoencephalographic studies, the radiologic and EEG findings could be definitely correlated.

Therapeutic implications: Abnormal EEGs, therefore, that do not clear up fairly soon after the acute brain syndrome is over point to some residual organic pathology. Prompt recognition of the early stages leads to a proper therapeutic program. Such patients first need medical care of the organic features of brain damage. Half of these patients have other systemic diseases, such as liver damage, which must be treated. Education of relatives as well as of the patient as to the significance of brain damage is important. Relatives are more tolerant of the patient's personality changes and unusual behavior, the better they understand that much of these disorders are beyond his control, but that the organic features will improve with prolonged treatment.

The patients require restraining care, either prolonged hospital or institutional control, until some insight can be established, or close supervision at home to prevent their access to alcohol. The judicious use of disulfiram or citrated calcium carbamonitrile to prevent drinking is an aid to home care of the patient.

The following 3 cases illustrate the value of repeated EEG, psychologic and pneumoencephalographic studies in pointing to intermediate stage of alcoholic brain disease:

Case 1: A patient in intermediate stage of alcoholic brain disease, reversible after 2 years of sobriety. A man of 50 had begun to drink heavily a few years earlier, soon after his son's death. At his first hospitalization for alcoholism, delirium tremens developed and was followed by two convulsions. An EEG recording taken on the day before the first convulsion showed slow activity with superimposed fast activity and minimal spike discharges. The second EEG, taken two weeks later, showed essentially the same findings except for a little increased fast activity. The third and fourth EEGs, taken 1 month and 2 months after the first, still showed abnormally slow activity, but with decreased fast activity and less seizure activity.

An acute alcoholic bout necessitated the patient's second hospitalization 1½ years later. His fifth EEG recording, taken then, showed much improvement, with only very mild fast activity; the sixth, taken a month and a half later, again showed generalized slow activity, but without spike or fast activity. The patient was then put on disulfiram and was able to abstain completely from drinking. The seventh EEG, taken a few months later, showed a normal pattern.

Case 2: A male, age 45, in early phase of intermediate brain disease; psychological tests confirmed organic disease and pneumoencephalography showed early brain atrophy. The patient had been a social drinker since college days. After discharge from the Army, following marital discord and divorce, he began excessive and compulsive secret drinking. He remarried and for 2 years before his admission he had had temper outbursts and rages and physically abused his wife. Even small amounts of alcohol produced blackouts and irrational periods, and his wife had to watch over him constantly. Psychotherapy was tried for months, and he joined Alcoholics Anonymous, but with little change in personality or behavior. He agreed to hospital care when his wife threatened to leave him. Two EEGs were normal. A battery of psychologic tests was diagnostic of neurotic character disorder, with diffuse organic impairment defect in immediate memory, some concreteness in thinking and a disturbance in his visual spatial organization. The pneumonencephalogram showed mildly dilated ventricles, dilated basal cisterns and all the subarachnoid spaces, suggestive of brain atrophy. This patient now takes disulfiram daily and has remained abstinent for 2 years. He is successful in both his home life and his business.

Case 3: Illustrates a case of intermediate brain disease that reached irreversible changes. A woman of 49 who had drunk excessively for many years, with violent episodes and extreme hostility toward her family, had had grand mal seizures at times during her drinking. During her first hospitalization she denied having any problems, blaming all her difficulties on her family. Of the 3 EEGs taken in her 3 week stay, the first showed severe fast activity and some slow activity; and the second and third, moderate fast activity but no slow ac-

tivity. A fourth EEG, taken a month after her discharge, showed an increased fast activity. Upon her second hospitalization, 2 years later, she was extremely demonstrative and euphoric, though oriented; a grand mal seizure on the fifth day was followed by a 2-day period of delirium. The fifth EEG, taken just before the delirious episode, showed severe fast activity and some slowing; and the sixth, taken 18 days later, showed some improvement with less fast activity, no slow activity and recovered alpha.

Four psychological tests (Rorschach, Bender-Gestalt Designs, Wechsler-Bellevue Digit Span Test and the Wechsler-Bellevue Block Design Test) were administered during the second hospitaliziation; all showed definite evidence of organic impairment. Pneumoencephalographic x-rays of the brain made elsewhere showed definite cerebral atrophy.

In the following case the disease was too far advanced for rehabilitative treatment to be effective:

Case 4: Male patient, age 49, illustrates a severe grade of chronic alcoholic brain disease, with permanent atrophy of the brain. The patient had been a problem drinker for 20 years. Presumably his drinking contributed to marital difficulties and in a few years his wife left him. He had lost many jobs because of drinking, but his father's influence had always helped him to find new work. After the father's death in 1954, the patient lived alone with his mother. He drank almost continuously except for periods when his mother took him on trips. He had been in contact with A.A. since 1949 and in recent years had gone to meetings quite regularly, but continued to drink. While living with his mother the patient tried to conceal his drinking from her, and she in turn acted constantly as a watchdog and nurse. During periods of drinking he would become ugly and sarcastic, telling his mother he despised her; on one occasion he physically abused and almost killed her. In 1954, after he had lost a job because of drinking he was committed to a state hospital for 3 months. Upon discharge he took a trip abroad and impulsively, on short acquaintance, married again without having previously obtained a divorce.

At the insistence of his mother and through the influence of A.A., he was finally brought for evaluation. An examination revealed an overly familiar, very pleasant, passive male patient. Although he admitted all of his difficulties with drinking, he minimized their importance and had no insight into the seriousness of his condition. He felt he could do all right if he could move to his own apartment, away from his mother. He saw no reason why he should either stop drinking or attempt to find useful work. He readily agreed to go along with our recommendations but it was quite obvious that he could not carry them out.

An EEG revealed a distinctly abnormal record with a mixture of slow waves and fast activity. A variety of psychological tests showed a generalized deterioration of his personality functioning, with evidence of organic factors, defects such as confusion and memory impairment, all suggesting serious brain damage. A pneumoencephalographic x-ray study of the brain was carried out and it was found that he had almost twice the normal amount of cerebrospinal fluid and there was marked enlargement of the entire ventricular system and patchy evidence of brain atrophy. He made no improvement and had to be committed to a state hospital.

DISCUSSION OF THERAPY

Since in many chronic alcoholic addicts alcoholic brain disease eventually develops, the widely held concept of alcoholism as primarily a symptom of a character disorder must be modified. In the initial stage of alcoholism, before addiction is firmly established, psychotherapy is often helpful. But after the onset of alcoholic brain disease all therapeutic efforts must be directed toward helping the patient rehabilitate himself. This means first, that the patient must completely abstain from drinking, in order to regain physiologic balance. Therefore individual or group psychotherapy and the aid of Alcoholics Anonymous should be mainly supportive. Disulfiram for chronic compulsive drinkers usually can give complete chemical restraint; combined with psychotherapy it is very helpful. Again, education of the patient's family as to the need for prolonged therapy and careful followup and enlistment of their aid in this program are essentials to successful therapy. The patient must continue with abstinence for the rest of his life and often he may become fairly well rehabilitated.

Even though our patients are informed of the seriousness of alcoholic brain damage, they are especially difficult to treat and may continue drinking and soon die of intercurrent disease or by suicide or become per-

manent institutional cases. If control can be established until the organic features clear and fairly normal judgment returns, then insight can gradually be established and motivation to learn to live without alcohol is aroused. Psychiatric evaluation to determine whether the alcoholism is symptomatic of a neurosis or psychosis must be also considered.

After insight is gained, psychotherapeutic efforts may be fruitful along with social and other supportive measures such as AA to bring about effective rehabilitation. I (AEB) have described our overall treatment program elsewhere(12).

PUBLIC HEALTH PROGRAM

The problem of alcohol addiction should eventually be tackled at a national level, with general education of the public as to the prevalence of chronic alcoholism and need for its control. Early detection and recognition of addiction and organic brain disease would require large numbers of professional personnel to carry out extensive surveys and research studies. Problems of treatment and of prevention would have to be handled at the level of a public health program, with substitution of a public health medical approach instead of the present punitive one. By this means many persons could be reached before addiction becomes established and brain disease becomes irreversible. Those patients with brain damage could be rehabilitated to the point where they could preserve sobriety and become useful members of society.

In all large cities, skid rows comprise a major problem. For example, in San Francisco, the country's most alcoholic city, the relief and welfare program for alcoholics costs taxpayers $4 million a year. It is estimated that about a thousand of these alcoholics repeatedly figure in arrests and other legal actions. Undoubtedly these persons suffer from alcoholic brain disease and should be so treated.

The problem must eventually be tackled at a national level, in our opinion, because it is too large a problem for municipalities or individual states to finance. The cost of a program of detecting addicts with incipient or established brain damage should be borne by a tax on profits of the liquor industry at the source—breweries, wineries and distilleries. Although these industries do not cause alcoholism, the use of their products contributes to the problem of addiction and mental deterioration. The cost to taxpayers of a nationwide rehabilitation program would be prohibitive, since the total number of addicts needing treatment exceeds the nation's state hospital population.

Conclusions

This study indicates the presence of a syndrome of an intermediate stage of alcoholic brain disease, midway between the acute and the chronic stages. In the intermediate stage the EEG changes, the clinical findings and the psychological test data lead to the diagnosis of incipient brain damage; the presence of cerebral atrophy can be confirmed by pneumogram.

The study of 227 cases showed 98 in the acute stage, 81 in the intermediate stage, and 48 in the chronic stage. In the 81 patients in the intermediate stage, 64 (79%) had abnormal EEG records, with organic brain damage indicated in 9 cases by psychological tests or pneumograms or both.

The implications for treatment are summarized: 1. The persistence of abnormal EEG records after the acute episode emphasizes the need for comprehensive medical treatment of the organic factors, before the brain damage becomes irreversible. These organic factors are often erroneously considered to indicate personality disorders, with consequent ineffective therapeutic measures. 2. The patient under institutional or other supervisory control must stop all use of alcohol. 3. After improvement of the organic features, the patient is ready to begin individual and group psychotherapy and a general rehabilitative program, including the help of Alcoholics Anonymous and similar organizations. 4. The relatives must be made to understand the seriousness of the disease, and their cooperation enlisted in the treatment program. 5. The problem of alcoholic addiction must eventually be attacked at a national level with steps to insure early detection of addiction and organic brain disease, and with a broad program of control of drinking and of rehabilitation.

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CURRENT STATUS OF CHILD PSYCHIATRY [1]

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That child psychiatry is a sub-specialty of psychiatry requiring special training for the development of competence has been declared in the establishment of certification in child psychiatry by the American Board of Psychiatry and Neurology. This arrangement postulates that in order to learn the techniques and procedures required in the treatment of children a psychiatrist must initially equip himself with an understanding of the clinical material and principals involved in the practice of adult or general psychiatry. With this foundation he can undertake the specialized training that is necessary for work with children. The Board requires a minimum of two years of approved training in a satisfactory facility for the practice of child psychiatry. The specialized training in child psychiatry must follow a minimum of two years of training in general psychiatry. The adequacy of the candidate's basic training is measured through the requirement that he become certified in psychiatry by the American Board before he applies for examination of his competence in child psychiatry.

For 50 years there have been psychiatrists who devoted their full time to work with children. With a primary interest in juvenile delinquency and probably influenced by Southard's and Fernald's use of ancillary disciplines in a collaborative program, William Healy organized the first clinic for children to serve the Chicago juvenile court in 1909. By 1912 he had moved to Boston, and with The Judge Baker Foundation developed a program that offered services for the broad spectrum of difficulties which presented during childhood. The delinquent was recognized as a troubled person who declared his need for help through his misbehavior and who, because he was not mature, could not provide and plan for himself with sufficient judgment and perspective. Efforts were directed toward understanding the child in the use of his capacities within the various environments which comprised his life.

With the assistance of the Commonwealth Fund of New York, the National Committee for Mental Hygiene nurtured the development of clinics sponsored by a variety of community interests. The term "community clinic" came into common use to designate that the service was part of an agency structure designed to meet a need which was recognized by the various organizations which served children. The home, the school, the orphanage, the family agency, the settlement house, and group recreational agency were concerned about children who could not accommodate themselves satisfactorily. The bureau of Children's Guidance of New York became an active training center and professional staff was developed which could man the newly established clinics. Demonstration Clinics were financed for specified periods of time. The effectiveness of the early efforts is attested by the record of communities which continued the services by providing on-going funds through civic, Community Chest, or other sources.

During the 1920's work centered around the principle of assisting the child to adjust to the setting in which he lived. The standard procedure involved obtaining an extensive history which at its best was an evaluation of the important influences which impinged upon the child. Histories became more than descriptive and were a compilation of the attitudes and reactive tendencies of each member of the family, teachers, classmates, friends, religious advisors, *etc.* Interviews were held often with others than the parents. When children were in foster care, information was obtained from foster workers and perhaps directly from the foster parents.

Many patients were referred by agencies, and it was the general practice to maintain a central social register in each community so that a clinic could know when the family had had contact with another social agency.

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[1] Read at the 115th annual meeting of The American Psychiatric Association, Philadelphia, Pa., Apr. 27-May 1, 1959.

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The cooperative case was one in which the agency with professional staff (usually social casework) contributed historical information and took responsibility in whole or in part for carrying out recommendations. The service was rendered to the referring agency as well as to the family.

The history included an account of the child's development both physically and socially. The evaluation of his aims and tendencies was augmented by the psychologist's measurement of his potentials with standardized tests (later with projective techniques) and the psychiatrist's appraisal in the interviews with the child. The information so compiled was reviewed at a diagnostic staff conference to which representatives of other agencies, teachers, ministers, *etc.* might be invited. At such a conference recommendations were formulated and their commission was assigned to members of the clinic staff or others. The clinic was in the position of evaluating the influence of parents and other professional workers upon the child and often found itself directing the practices of schools and other agencies.

While other social agencies were learning to recognize the variations in ability and behavior of children, the clinic easily assumed an authoritative role and the psychiatrist was the natural leader of the clinical group. Social workers and psychologists learned to recognize the common disorders of children, and case loads included more and more children who were not grossly deviant. Rivalries developed among the disciplines within some of the clinics and even between clinics and other self-sufficient agencies.

Satisfaction with diagnosis emphasized the importance of treatment. Interest in treatment was stressed further as knowledge of the nature of the difficulties of children became diffused beyond the profession of psychiatry. By the end of the 20's, a good deal of work was being done with parents. Initially, the purpose was to prevent parents from interfering with the efforts that were made to benefit the child. This sometimes took the form of treatment of the parent which might be attempted by whichever member of the clinic team had developed skill in psychotherapy. Caseworkers and psychologists, as well as psychiatrists, were turning to personal analysis as a measure of enhancing their skill in therapy, and the role of the psychiatrist as director or leader of the clinic group was sometimes challenged.

Skills in individual psychotherapy did develop. Americans went to Europe to learn the techniques of the analyst, and during the 30's many European analysts came to the United States. In this country effective treatment procedures were developed by child psychiatrists who were not identified with the analytic movement. Analyst and non-analyst have worked side by side in the United States and sometimes within the same clinic. We are still progressing in our techniques of individual treatment of children steadily enough so that it is yet too early to outline exclusively what should be the training of a child psychiatrist and what his treatment techniques. There is, however, general agreement about a good deal that he must know and about the training and working experiences that he must have.

As the contribution of the clinic centered increasingly around the provision of psychotherapy, the contacts of the clinic staff became more limited to members of the patient's family or those social workers in foster care agencies who had direct responsibility for the child. As mentioned above, the professionals in other agencies or institutions became informed on the psychological aspects of deviations in growth and development and did not call upon the clinics as frequently for diagnostic assistance. They resented the efforts of clinics to direct their practices. Clinical workers also began to appreciate the complexity of other professional tasks and became cautious about assuming responsibility for recommendations, the effectiveness of which rested with the work of another agency.

Work became oriented around the diagnosis and treatment of the child. There was a period when certain clinics saw their tasks as the treatment of the child-parent relationship. This gave way to a recognition that treatment was with the individuals who were in relationship to each other, with the child as the patient. A variety of approaches developed in considering the

job with the parent. While some clinics outlined their task as the treatment of the parent, others viewed work with the parent as a casework service. I believe that in the majority of clinics today the procedures which are carried out with parents are materially influenced by a primary concern for the successful treatment of the child. One of the major advances in modern psychiatry has been the understanding of the importance of the influence of other members of the family upon a patient. This has developed from the work of the child guidance clinics.

As clinical contacts in child psychiatry became more circumscribed to the child and his parents or members of his immediate domestic environment, private office work became feasible. Private practice had to await the development of clinical skill and in turn understanding of the remainder of the medical profession and the lay public so that services would be solicited. Early attempts were made to treat children individually with a minimal amount of work with the parents. Private practitioners, including child analysts, quickly recognized the importance of doing some work with parents. It may indeed be that the most important influence in the growth of private child psychiatric practice was the general acceptance which psychiatry enjoyed following World War II. I believe that private practice was an outgrowth of the circumstance that procedures involved in the treatment of the child and his guardians could be encompassed physically within the private office.

It remains for experience to determine whether individual practice, which may indeed include the collaboration of other disciplines, will become a common method for the provision of child psychiatric services to those familes who can afford a private fee. Today there are adherents of the private office arrangement and adherents of the clinical method, each of whom considers his way of practice to hold forth advantages. The answer to this question may rest upon personal preference. It may be determined economically. It may be influenced by forces which bear on the practice of medicine generally which we cannot now foretell. In any event, private practice in child psychiatry has become a reality since World War II even as the clinics themselves have become more numerous.

With the growth of child psychiatry it was inevitable that professional associations developed. The National Committee for Mental Hygiene had benevolently fathered the development of the clinics with the financial aid of the Commonwealth Fund. During World War II the Division of Community Clinics of the National Committee for Mental Hygiene organized meetings of the clinical directors to elicit their participation in the management of the affairs of the clinics. Practice and procedures were discussed and soon the annual assembly of clinic personnel included meetings of social workers and psychologists. Following the war, it was evident that the growth of the clinics would be so rapid and so extensive that coordination through personal visits and interest by members of the staff of the National Committee for Mental Hygiene would be difficult.

The need for authoritative definition of standards for practice and training was emphasized as new clinic boards were being organized and staff positions created which could not be filled readily. At a meeting of clinical directors convened by the National Committee for Mental Hygiene a decision was made to create the American Association of Psychiatric Clinics for Children (A.A.P.C.C.).

This Association was initially concerned with protecting the level of child psychiatric clinical practice. The policy was to uphold the professional standards of the professional disciplines which worked collaboratively in the clinics. Social casework had clearly defined standards for training and experience. They were established by the American Association of Psychiatric Social Workers (later A.A.S.W.). Clinical psychology was actively establishing itself as a clinical and professional discipline and shortly declared its training requirements which were implemented at the graduate level in universities. Child psychiatry had no defined standards for the determination of competence of its representatives beyond the achievement of certification by the American Board of Psychiatry and Neurology which was in adult or general psy-

chiatry. The Board had established the precedent of accepting a satisfactory year of training in a children's clinic as the third of the 3 years of required academic training.

The A.A.P.C.C. defined requirements for the training of child psychiatrists who were to work in the member clinics. It also outlined requirements for clinics that were to conduct training which would be approved by the Association. Because these were the only existent standards, other organizations supported these requirements, and A.A.P.C.C. standards came to have an influence in American psychiatry beyond that which was initially conceived. Review and approval by the Association, however, could be extended only to those clinics which were interested in being identified with the Association and involved only personnel employed in the clinics.

During the years following World War II, there was controversy over the opinion held by child psychiatrists that special training was required to do adequate psychiatric work with children. The creation of a Committee on Child Psychiatry within the newly formed Group for the Advancement of Psychiatry, the establishment of a Committee on Child Psychiatry in the American Psychiatric Association, the naming of a Section in the APA and the establishment of a Committee on Training in Child Analysis in the American Psychoanalytic Association were acknowledgements of the discreteness of the field. These units created a forum for child psychiatrists who were in individual practice, and included as well the psychiatrists from the clinics.

A recognition that the scope of child psychiatry went beyond the organized clinics, including individual practice and some individual teaching appointments, brought forward an interest in an association of child psychiatrists. Concomitantly, sentiment developed in certain areas of organized general psychiatry that within the association of clinics the interests of the child psychiatrist might be subjugated to a multidisciplinary majority. The American Association of Psychiatric Clinics for Children itself recognized that child psychiatry differed from the other professional disciplines in that it had no set of standards for training which was declared and upheld by a group within its own discipline, not officially associated with A.A.P.C.C. and which could serve as a standard for the evaluations conducted by A.A.P.C.C.

These influences and a desire for academic interchange within a professional group limited to the child psychiatrists led to the organization of the American Academy of Child Psychiatry. The Academy has established criteria for the invitation of child psychiatrists to its membership. It has been considering a set of standards for training. It is in the process of determining how actively and extensively its membership wishes to assume leadership in American child psychiatry.

A year ago the Council of the APA endorsed, on the joint recommendation of its Committees on Child Psychiatry and on Standards for Hospitals and Clinics, a statement that child psychiatry was a subspeciality of psychiatry and that competence called for special training. The APA later accepted in principle a statement of Standards for Training that called for 2 years of specialized training in child psychiatry in addition to 2 years of training in general psychiatry for those who would work with children.

As early as 1948, sentiment was advanced for the establishment of certification in child psychiatry. The American Board of Psychiatry and Neurology looked favorably upon the proposal and consulted a group of child psychiatrists. Possibly because opinions on procedure were not consistently supported, the Board did not act at that time.

In the summer of 1957, the matter of certification in child psychiatry was again raised by the American Board of Psychiatry and Neurology. Suggestions had been advanced that there be an independent board in child psychiatry. This might have been a difficult proposal for which to obtain the approval of the Advisory Board for Medical Specialties which has declared itself against the unnecessary recognition of additional specialties in the field of medicine. It appeared that there was reasonably general accord among child psychiatrists that certification be carried on under the authorization of the parent American Board of

Psychiatry and Neurology. The arrangement declares child psychiatry as a subspecialty of psychiatry.

After consulting a number of individuals in the field of American child psychiatry, several recognized leaders were summoned to a meeting to consider the advisability of recommending the establishment of certification procedures. Following the favorable outcome of this meeting, a Committee on Child Psychiatry consisting of 6 members was appointed by the American Board of Psychiatry and Neurology. Meanwhile, the Advisory Board for Medical Specialties had been asked to approve the project. The Advisory Board authorized the American Board to undertake steps to evaluate authoritative opinion in child psychiatry and notified the Boards in the other specialties.

The Committee on Child Psychiatry met in June, 1958, with the president and secretary of the American Board of Psychiatry and Neurology, and drew up a statement of requirements and of procedures for examination and certification of child psychiatrists. The American Board of Pediatrics requested further consultation, and at a meeting of representatives of that Board and the American Board of Psychiatry and Neurology, an agreement was reached to include a pediatrician on the Certifying Committee. The pediatrician would act in an advisory capacity and would not serve in the examination of candidates. Members of the Committee on Child Psychiatry were among the representatives of the American Board of Psychiatry and Neurology who attended the meeting with representatives of the Board of Pediatrics. The statement of policies regarding training, application and examination was eventually approved by the various Boards and the Advisory Board for Medical Specialties.

The American Board of Psychiatry and Neurology then established a Committee for Certification in Child Psychiatry. This was in February, 1959. The brochure of Information for Applicants Applying for Certification in Child Psychiatry states that

> This was done to establish officially the field of child psychiatry as a definite area of subspecialization in psychiatry and to provide a means of identifying the properly trained, experienced child psychiatrist from those who claimed proficiency in this field without adequate background and qualifications.

The brochure states further :

> The actual mechanics of certification of qualified candidates and the establishment of basic policies has been delegated by the American Board of Psychiatry and Neurology to this special committee which will operate under the supervision of the parent board. This Committee on Certification in Child Psychiatry consists of six certified child psychiatrists appointed by the Board and responsible to the Board. As a Committee of the Board, it operates under all the basic policies established by this corporation.
>
> Psychiatrists who have been continuously in the full time practice of child psychiatry since July 1, 1950 or before may apply for certification on record (without examination). If the major interests and activities of their practice is with children or adolescents, this will be regarded as full time practice of child psychiatry. Applicants must have been previously certified in psychiatry by the American Board of Psychiatry and Neurology except in those instances where this requirement has been waived by the Board for good and sufficient reasons.
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> This certification is for those who are currently in the specialty of child psychiatry and not for those who have been in the field in the past. Applicants who have previously practiced in the field of child psychiatry but who have left this specialty for other types of practice must show that in the two years preceding application their major interests and activities have been in the field of child psychiatry.
>
> Those child psychiatrists not qualifying under the above rules and regulations will be considered as applicants for certification by examination. Their major interests and activities in their current practice must be devoted to psychiatric problems of children and adolescents. Should they have left the field of child psychiatry for other types of practice but otherwise fulfill the training and experience requirements, they must show that the two years prior to application have been in specialized practice in child psychiatry.

To qualify for examination candidates must have 6 years of psychiatric training and experience. Two years shall have been satisfactory training in child psychiatry in programs acceptable to the Committee on Certification. The statement is included in the brochure that

It is advisable that those seeking the certificate of specialist in child psychiatry who receive their primary training in psychiatry should have training in the pediatric aspects of general medicine. Such training may be offered in lieu of two years of practice experience.

Certification will identify the properly trained and experienced child psychiatrist who has been actively engaged in the field. It will be necessary to establish a basis for the evaluation of training and of the settings from which training will be approved. This will be an early task for the Committee on Certification in Child Psychiatry.

It is too early to anticipate fully the influence certification will have in the field of child psychiatry in relation to practice and to professional organizations. The competence of practitioners who offer their services to children should quickly assume a generally adequate level. Influences in relation to professional organizations will manifest themselves more gradually.

The American Psychiatric Association does not have standards for outpatient clinics in either child or adult psychiatry excepting as these clinics are associated with a mental hospital. There is a Committee on Standards for Hospitals and Clinics. Outpatient clinics currently achieve approval as they meet the recommendations for mental hospital personnel and the approval of the hospital administrator. There is need for the declaration by the American Psychiatric Association of standards for outpatient clinics which operate independently.

The A.A.P.C.C. will now be in a position to support the standards for training in child psychiatry determined by the Committee on Certification in Child Psychiatry of the American Board of Psychiatry and Neurology rather than establishing requirements of its own. Requirements for certification are similar to those outlined for the director of a clinic approved for training with A.A.P.C.C. They are higher than those enforced in evaluating the competence of the psychiatric director of a clinic asking consideration for membership. If standards for training in child psychiatry become sufficiently well defined, A.A.P.C.C. will be in a position to place its major emphasis on the composition and collaborative working arrangement within the clinic group.

The Academy of Child Psychiatry has membership requirement which are somewhat more exacting than those defined by the Board. More working experience is necessary, and the candidate must have had a primary and long continued interest in child psychiatry. At present, certification by the American Board of Psychiatry and Neurology is a membership requirement for those individuals who completed their training after January 1, 1946. The Academy has not yet had an opportunity to consider whether it will require certification in child psychiatry of those who are to be invited to its membership.

In half a century child psychiatry has become established as a field of medical practice within the specialty of psychiatry for which special training is necessary to acquire competence. Standards and procedures for the evaluation of candidates for certification and their training will be refined as examinations are conducted. Standards will be developed also for the evaluation of the setting in which satisfactory training can be obtained. The professional organizations concerned with the field of child psychiatry will continue to provide the forums from which knowledge and recommendations for standards of practice and training will evolve.

THE MIND-BRAIN PROBLEM AND HUGHLINGS JACKSON'S DOCTRINE OF CONCOMITANCE

MAX LEVIN, M.D.[1]

PART I: WILL, VOLUNTARY AND AUTOMATIC FUNCTION

The first object of this paper is to indicate the value of Hughlings Jackson's "doctrine of concomitance" in regard to the relation of mind and brain. Of all who have tackled this thorny problem, it seems to me that Jackson was the most realistic.

More specifically, I shall consider those cases in which the patient has lost the ability to perform an action on command, *i.e.* voluntarily, though he can still do it spontaneously or automatically. I hope thereby to achieve a double purpose: to consider one aspect of mind, namely, will or volition, and to point to a second great contribution of Jackson's, his concept of "reduction to a more automatic condition."

In his work on aphasia Jackson showed that it is not words that are lost, but the use of words in particular contexts. A favorite example was the man with motor aphasia who cannot say "No" on command, but can say it spontaneously. Thus if asked a question calling for a negative reply, he answers "No." And when he is emotionally excited, as when he sees his child creeping too close to the fire, he shouts "No, no, no."

Here, then, is a man who cannot say No when he "wills" to, but can say it spontaneously or automatically. Does this mean that there are centers for speech, which operate under the command of higher centers for will and mind, and that when we undertake to say or do something, suitable impulses pass down from these higher psychic centers to lower speech and motor centers? Such an explanation is attractively simple and might appeal to a first year medical student. It should not appeal to mature physicians, but it does to some, for here is what an outstanding neurologist once said. Speaking of epileptic twilight states (in the days before electroencephalography) he said they are also called psychic equivalents, because "they are the result of a discharging lesion in psychic centers, just as grand mal is the result of a lesion in motor centers." He assumed that there are centers for the higher and more abstract function, mind, superior to and in command of lower centers for the more concrete activities, movement and sensation.

Jackson opposed such a view. He held that the *entire* brain is sensorimotor, not just the areas so designated by conventional neurology. He denied that the highest cerebral centers are basically different from lower centers. He said it would be incredible if, as one passed upward in the hierarchy of levels, one came suddenly upon centers constituted differently from those below. On the contrary, higher centers are constituted like lower centers, being only more complex. He regarded the central nervous system as a mechanism for the coordination of impressions and movements. (By "impressions" he meant impressions made on receptor organs.) Spinal centers achieve a relatively simple coordination, while higher centers achieve one that is more complex. All cerebral action is reflex, even in the highest cerebral centers, which he regarded as the "organ of mind." Of course, his conception of "reflex" is broader than that held by some neurologists.

REFLEX ACTION IN THE HIGHEST CEREBRAL CENTERS

Some neurologists would limit the term reflex to "automatic fixed inborn responses" of subcortical structures. These responses are relatively automatic and inflexible, "a necessary consequence of anatomically prearranged fixed nervous channels." By contrast, responses from the cortex are variable, flexible, relatively unpredictable. Neurologists of this school of thought deplore Pavlov's term, conditioned *reflex*, which "leaves the word 'reflex' with no meaning whatever, except response to stimulus."

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(Quotations in this paragraph are from Denny-Brown(1).)

Elsewhere I have tried to show why Jackson's view is preferable(2). As an example of reflex action in the highest cerebral centers, the following incident is submitted.

Driving on a quiet country road, alone in my car, I was deep in thought. About to overtake a car just ahead, I sounded two sharp warning notes on my horn; I then passed the car, still deep in thought. A few moments later I became aware that I was humming the opening theme of Beethoven's Third Symphony, the theme that immediately follows the two great staccato opening chords. My curiosity aroused, I wondered why that particular theme had intruded itself on me at that moment. Reviewing the antecedent situation, I remembered the two staccato notes of my horn, which had "reminded" me (without my being aware of it, for I was deep in thought at the moment) of the two opening chords of the symphony. The theme followed in due course, and I hummed it unconsciously until the fourth or fifth bar, when suddenly I noticed I was humming. The humming was a reflex, a response to the two notes of the horn.

This incident shows two things. First, mentation can be unconscious (not that this proposition today stands in need of proof). Second, mental processes are reflex, their unpredictability notwithstanding. No one can predict the result, if any, that will ensue when a driver in deep reverie honks his horn twice. But the response in this instance, the humming of the theme, was clearly a reflex. It is an example of "chaining," a term used in psychology to denote the process whereby one response provides the stimulus for the next, as in reciting a poem from memory, when each line as it is spoken brings the next one to mind. An unpredictable response is no less reflex than a predictable one; it is only more complex.

But, really, is there such a thing as unpredictability? If we knew everything about the brain, and knew its precise state down to the smallest detail at a given moment, we would be able to predict the response to any stimulus, no matter how complex. Unpredictability is but a measure of our ignorance.

THE DOCTRINE OF CONCOMITANCE

With his materialistic view of the highest cerebral centers, according to which they resemble the lower spinal arcs in basic constitution, differing only in being more complex, how did Jackson relate mind to brain? Obviously we need a brain to think, but it is *we* and not the brain that thinks. The brain is merely a mass of tissue. Jackson asserted that the question is insoluble. One can only say that mentation *attends* cerebral function, is "concomitant" with activity of cerebral tissue. Beyond that we cannot go. We cannot say how a material thing, tissue function, is transmuted or gives rise to an immaterial thing, mental function.

Thus, speaking of "the relation of consciousness to nervous states" (*i.e.* physical states), Jackson said(3):

> The doctrine I hold is: first, that states of consciousness (or, synonymously, states of mind) are utterly different from nervous states; second, that the two things occur together—that for every mental state there is a correlative nervous state; third, that, although the two things occur in parallelism, there is no interference of one with the other. This may be called the doctrine of Concomitance.

Again he said(4):

> We cannot understand how any conceivable arrangement of any sort of matter can give us mental states of any kind. . . . I do not trouble myself about the mode of connection between mind and matter. It is enough to assume a parallelism. That along with excitations or discharges of nervous arrangements in the cerebrum, mental states occur, I, of course, admit; but how this is I do not inquire; indeed, so far as clinical medicine is concerned, I do not care.

Sherrington(5) concurred in this view.

We return to the aphasic who cannot say "No" when asked to, yet says it spontaneously. Saying "No" or any other word, indeed performing any act, is a response to a stimulus. The stimulus is the situation that evokes the response. We must consider the response as part of a totality that in-

cludes the antecedent stimulus. Since no two situations are exactly alike, there is no limit to the number of neuronal patterns (engrams) for the saying of "No." These engrams, to be sure, all converge upon a final common path, but before they do so they differ in the position they occupy in the hierarchy of levels.

The engrams for the voluntary "No" are on a higher level than those for the spontaneous or automatic "No." Voluntary function is more complex than automatic function. When a man says "No" because you have asked him to, his response is a calculated act. By contrast, when he shouts "No" because his child is too close to the fire, his response is automatic; he speaks "without thinking"; the word comes to his lips automatically.

In motor aphasia there is disturbance of higher pathways, but little if any of lower pathways. Voluntary function is lost while automatic function is preserved. This is what Jackson called "reduction to a more automatic condition."

There is no circumscribed center for will. Will cannot be considered apart from the thing that is willed. When the aphasic tries unsuccessfully to say "No" on command, will is a mental function concomitant with activity of certain engrams, those engrams that represent the situations that can no longer rouse the No-saying mechanism.

Jackson had the useful habit of studying a physiological principle as it manifests itself in a wide variety of clinical disorders. I will give two further examples of loss of voluntary function with preservation of automatic, one of them being less complex than speech, the other more complex.

Hysterical astasia-abasia is the less complex example. Here the patient cannot walk when you ask him to, or when he "wants" to, but under emotional stress, as when the building is on fire, he walks and runs without let or hindrance.

The more complex example is seen in toxic delirium, when the patient, being disoriented, cannot name your vocation on command, yet spontaneously he addresses you as "Doctor"(6). (This phenomenon is not elicitable in every case, nor every moment in the same case.) In many cases I have made the following experiment. The delirious patient addresses me as "Doctor." A moment later I ask him what my occupation is, and he replies that he does not know or else, not knowing that he doesn't know, he answers incorrectly. We then continue our conversation until the next time he addresses me as "Doctor," whereupon I again ask him the question and again he fails. This can occur many times in a single interview.

In several striking instances the patient addressed me as Doctor in the very sentence in which he confessed his ignorance. Thus, one patient, when asked what my work is, replied, "I wouldn't know, Doctor—is it painting and decorating?

This phenomenon in delirium parallels the aphasic's difficulty with "No." To say "No" on command is a highly voluntary act. So also is the patient's reply to the question "What is my occupation?" Answering this question is a studied and calculated act. By contrast, when the aphasic shouts "No" under emotional stress, or when the delirious man spontaneously and unwittingly greets you by saying "Good morning, Doctor," the speech is automatic; the words issue automatically.

The parallel applies also to those striking instances in which the delirious patient addresses you as Doctor in the very sentence in which he voices his ignorance of your occupation. The parallel is with the aphasic patient who utters a word spontaneously at the very moment he is confessing his inability to say it. Thus, striving to say No on command, the patient may give up in despair and cry out, "No, I can't."

This remarkable parallel between a "physical" symptom, the aphasic's inability to say something, and a "mental" symptom, the delirious man's inability to name your vocation, is further indication of the soundness of Jackson's argument that higher and lower cerebral centers obey the same laws, that they differ only quantitatively and not qualitatively.

To further understand reduction to a more automatic condition, we must consider its opposite. In some diseases it is the automatic functions that are lost. A useful contrast is between hysterical astasia-abasia and tabes dorsalis. The hysteric cannot walk on command, but can walk and run when

the house is on fire. The opposite is true of the tabetic, for he cannot walk automatically. In order to walk he must drop all else from his mind and concentrate on floor and feet, carefully noting every step. In a burning building he would be helpless. He is the victim, not of reduction to a more automatic condition, but of what we may call "loss of automatic patterns," which are lost because of lesion of lower spinal arcs. In hysteria, where the disturbance is in the highest cerebral centers, these lower arcs are intact and will go into action in response to instincts of an imperative nature.

PART II : MEMORY

The role of the limbic system in behavior has received much attention lately, thanks in great measure to the notable work of MacLean(7) and to psychological studies in man by Penfield and Scoville and their associates. Among other things it has been shown by Scoville and Milner(8) and by Penfield and Milner(9) that the hippocampus and related structures play an important role in memory, and that in bilateral lesion of the hippocampus and hippocampal gyrus there is profound loss of recent memory.

These findings are of great importance, for they show that the hippocampal areas are essential to adequate memory function. Penfield and Scoville are careful not to say that there is a "center for memory" in these areas. But Penfield makes some statements that appear misleading. Thus in his paper on "Memory Mechanisms"(10) he says :

> The records of an individual's thinking lie dormant in the patterns of his temporal cortex until he activates them. . . . Whenever a normal person is paying conscious attention to something, he is simultaneously recording it in the temporal cortex of each hemisphere. Every conscious aspect of the experience seems to be included in these cortical records.

He speaks of "the memory cortex of the temporal lobes."

In his contribution to the Ciba Symposium(11), after speaking of the "ganglionic record of past experience," Penfield says :

> The nervous tissue that preserves this record constitutes a functionally separable portion of the brain since bilateral removal of the inferior mesial zone of both temporal lobes, including the hippocampal system, prevents subsequent preservation of the experience.

No one admires and respects Penfield and his work more profoundly than I do, but I submit that the passages quoted seem to suggest that the things we remember are "recorded" in the "memory cortex," that their "every conscious aspect" is recorded there, to remain in abeyance or, as it were, on file until they are needed. Nothing could be more wrong.

If, having studied maps and pictures of New York City, you remember that Manhattan is a long narrow island lying North and South, with a cluster of skyscrapers at the lower tip and another cluster near a large rectangular park in the middle, surely the seat of this memory is not the hippocampus. Or, to suppose a chess expert who is memorizing a game while playing it, it would be amazing if so elaborate a performance were mediated by so ancient and primitive a structure. The hippocampus dates back to the dawn of the forebrain and is scarcely more highly developed in man than in lower forms. To visualize and remember an elaborate spatial system must call into play a network of complex neuronal circuits in the new cortex, not the old. Moreover these circuits, or engrams, are not contained within a relatively small area of neocortex, such as the visual area, but are spread out so as to involve motor areas as well, for visual imagery involves motor as well as sensory function(12).

Just as there is no circumscribed center for will, and will cannot be considered apart from the thing that is willed, so it is with memory. Memory is an abstraction, and there is no center for it. Memory cannot be considered apart from the thing that is remembered. If you remember having played tennis yesterday, this act of memory is made possible by activation of engrams having to do with certain movements. If you remember having attended a concert the night before, there is activation of engrams correlative with auditory and visual images.

This is not to deny the evidence adduced by Penfield, Scoville and others, showing

that the limbic system plays a role in memory. But we cannot say what the role is. We can only say that the limbic system somehow facilitates the activation of neocortical circuits concomitant with images and movements. Perhaps the role of the limbic system is like that of janitors and maintenance men in a university. These men heat the buildings and make them habitable, and without them the work of the university would come to a halt. But the university is not centered in them. The essence of the university is in the professors and scientists who work there.

It is a manifestation of the wisdom of Nature that she has placed the memory facilitator in the old rather than the new brain. She has put first things first, for it is more important to remember the things we learn with our old cortex. As MacLean has shown(13), the limbic system mediates behavior that insures survival, behavior concerned with feeding, self-protection and propagation. A medical student must remember that the saphenous vein lies in a certain part of the leg, but he wouldn't die if he forgot it. But it is a vital necessity for a growing pup to remember that cats have claws.

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COMMUNITY PLANNING AS A SUPPORT TO TREATMENT [1]

M. J. ROCKMORE, M.A., AND ELIAS J. MARSH, M.D.[2]

During World War II, the concept of limited service based on differential diagnosis eventually supplanted the early Selective Service criteria which resulted in a staggering N-P rejection rate. Psychiatric-combat first aid and the neuropsychiatric reconditioning facility replaced early hospitalization in closed wards. Finally mental hygiene units in all installations and echelons moved psychiatry out of the protective confines of the mental hospital.

The similarity with civilian problems of today is striking. As during the War, a relative handful of trained specialists inundated with an insurmountable quantitative problem, are not permitting themselves the luxury of pre-occupation with scientific problems that provide the comfort of isolation or contemplation. Although they recognize the need for basic research they have not permitted its scarcity nor the lack of sufficient genetic understanding to keep them from moving into the arena of community mental health and applying empirical knowledge to the prevention and treatment of mental disorder. For practical reasons, and in response to pressures similar to those of war-time, a variety of clinical psychiatric services are mushrooming outside the mental hospital: open hospitals with their adjuncts "day" and "night" hospitals, sheltered workshops, "half-way houses," the mental health center, mental aid fellowship groups, *etc.*

These practical approaches appear to have had some impact on our problems despite the increasing shortages of personnel. The statistical picture of the resident population of mental hospitals throughout the country bears witness to this fact. A few years ago forecasts of increasing needs for inpatient facilities differed only in the estimate of how many additional beds would be required. In 1956, however, continuing increases came to at least a temporary halt. Figures for that year showed a decrease of 7,000 in the patient population. The decrease continued by another 3,000 in 1957, and preliminary figures indicate a decrease of 7,000 more in 1958 [3]. The really striking evidence that these decreases result from the new programs cited above, however, is the fact that the decrease in patient population has been accompanied by continued high admission rates. More patients are being admitted but as a result of the practical efforts of practical men they are no longer increasing our hospital populations.

Many more patients than ever before are leaving our mental hospitals to return to their communities—perhaps a quarter of a million a year. It is the purpose of this paper to note and to re-affirm some of the responsibilities which go hand in hand with these clinical successes. We assume that the majority of these patients leaving the hospital have achieved a degree of clinical recovery that warrants planning for some form of extramural living. It has been suggested that failure to act on early conditional release of patients will lead to chronicity, hospitalism, and continued inpatient treatment. The decision to release patients from the hospital, therefore, demands a carefully balanced consideration of the desire to avoid chronicity and the likelihood of the patient's success in extramural living. The former is largely a hospital responsibility, and the latter largely that of the community.

Historically, especially since the public clamor of the 1870's, the spotlight has been on admission procedures. The heavy emphasis of community pressure has been to safeguard individual civil rights and originated in the development of more humane treatment of persons suffering mental illness who were moving through social institutions, *e.g.* almshouses, to our hospitals. Too little has systematically been done as far as release procedures are con-

[1] Read at the 115th annual meeting of The American Psychiatric Association, Philadelphia, Pa., Apr. 27-May 1, 1959.

[2] Respectively: Chief, Psychiatric Social Service and Chief, Division of Community Services, Connecticut State Dept. of Mental Health, Hartford, Conn.

[3] Council of State Governments, Sidney Spector, Director, Interstate Clearing House.

cerned. Periodically, there is furor in the Press concerning acts committed by ex-patients, or more recently there is a startle reaction in the general public's discovery that they are living with an "open hospital" in their midst. Generally speaking, however, hospital administrations are sorely pressed by ever increasing admissions, shortages of trained personnel, the management problems of aging buildings and equipment, the perpetual fiscal problems, and the other all too familiar details. The allocation of sufficient time and thought, not only to release procedures but to the overall community planning necessary to meet the demands of the patients returning to extramural living, rarely receives a high priority.

A major obstacle to planning for adequate community services is the question of who is going to pay the bill. Despite tremendously increased appropriations of public tax funds, we still find ourselves administering programs which do not enable us to utilize our professional knowledge to the fullest extent. Realistically we simply cannot expect indefinitely continued budget increases to expand our programs, even if training facilities were turning out the skilled manpower necessary for such expansion. Our only alternative, therefore, is to make maximum use of our current resources and to find new ways of realigning them in the light of our understanding of the needs of our patient population.

This suggestion is not offered as being either new or revolutionary. In relation to the problem of aging it has been said, "If basic community services were improved then psychiatric clinics would be really utilized as such"(1). In another study it appeared that 4 out of 5 patients treated in a child guidance clinic over a period of 25 years might have as appropriately been treated in non-psychiatric agencies(2). A study of psychiatric clinics in New York City some years ago was subtitled, "A Study Toward the Prevention of Waste"(3). These three by no means unique observations cover the entire range of psychiatric patients and all point to the need of a closer rapprochement with community resources.

"Community resources" is a tidy concept which covers a wide range and variety of efforts. The very tidiness with which it is articulated belies its complexity, its essence, and the creativity inherent in the utilization of its possibilities. Webster gives us clues in the literal definition—a *resource* is a new or reserve source of support, a means of resort in exigency, or a stratagem; a *community* can be society at large, the public or people in general, and in a more restricted sense, it is the people of a particular place or region. This frame of reference excludes the stereotype and places a heavy burden of responsibility on any professional at any level of operation who seeks to identify and employ "community resources" in his endeavors.

For our present considerations we will not plan to emphasize the mental hospital "community." Rather we will here point up examples wherein exploratory efforts in "society at large" may lead to more constructive sources of support to patients who have improved to the extent that they should be encouraged to deal with increased reality demands.

This approach is admittedly artificial because the mental hospital itself should be truly a community resource. Proper planning for the discharge of a patient from the hospital and his adequate convalescent care is best started at the time of his admission (4). This, of course, is primarily a clinical responsibility as it relates to the individual patient. We are here more concerned with the type of broad planning and policy making that involves organized Federal, interstate, state, or local activity. Any or all of these may have an impact on clinical treatment. It is the responsibility of the psychiatrist both as a clinician and as a citizen to identify and take advantage of the community resources that do exist, and to make known the needs for hitherto nonexistent community resources that might be desirable or even essential for adequate treatment of patients. When these new resources can be provided only by organized community effort it is further the responsibility of the psychiatrist to provide the leadership that will ensure their establishment in accordance with the best professional knowledge and practice.

An example of the kind of planning that must be done at the Federal level is in the area of Public Assistance. Many a psychiatrist has found himself in the following dilemma : A patient has shown considerable improvement, and in the best clinical judgment the next step in treatment calls for a living arrangement in the community. The patient is without economic resources and requires economic subsidy. The Federal Handbook of Public Assistance Administration indicates that "a patient on conditional release from a public mental hospital where he was an inmate—is not an inmate of a public institution if he is free of controls by the hospital, other than professional help or guidance relating to his mental condition." This theoretically would make him eligible for Public Assistance. Nevertheless, in many states the procedure is such that the patient who requires aftercare supportive treatment will be discharged prematurely to become eligible for public assistance. The alternatives in most instances are retaining the patient for continued hospitalization, or discharging him and hoping that relapse and re-admission will not occur. Ideally, one would like the reality planning to provide for continued outpatient treatment with the public assistance participation as an integral part of the plan. Too frequently this is not possible. Where it is possible, the timing factors so important in the release of patients, become so complicated by the administrative procedure that the optimum point at which release should take place cannot be adequately considered.

Much of this maze of planning stems from the original exclusion of "any individual (a) who is a patient in an institution for tuberculosis or mental diseases or (b) who has been diagnosed as having tuberculosis or psychosis and is a patient in a medical institution as a result thereof."[4] The language of this aspect of the law lends itself to detailed analysis, interpretation, judicial conjecture, and heated argument. We needn't here point out that "psychosis" is not a synonym for "mental illness."

Psychiatrists working in state programs are acutely aware of these ramifications. At the recent annual conference of the State and Territorial Mental Health Authorities with the Surgeon General of the Public Health Service, the following recommendations were passed :

> That the Secretary of Health, Education and Welfare propose to the Congress legislation to amend existing Social Security Laws so that they do not discriminate against persons with any type of illness mental or physical.

This resolution is the result of individual psychiatrists moving from official positions. By the nature of this particular conference, the American Psychiatric Association as such was not a participant although its Medical Director was present as an invited guest. There is, however, an important and valid role for an Association such as the APA to play in the area of Federal legislation. An Advisory Council of Public Assistance, established by law, is reviewing aspects of the Federal Public Assistance Program. This group is required to report by January 1, 1960 on needed changes in the Social Security Act. Its 12 eminently qualified members do not include a psychiatrist. However, official liaison from this organization would offer ample opportunity to present to the Council the problem of the mental patient.

The possibility of participating in planning on the national level by a national professional "community" such as the APA, can be extended to include many other activities. For example, the Children's Bureau, which lacks a psychiatrist on its staff, notes little information regarding the need for psychiatric services for children. Yet state mental hospitals are regularly used as a resource for children(5).

Certain kinds of problems require planning among the states independent of participation by the Federal government; for example, planning for a mentally ill resident of one state who finds himself somewhere else in the country, or the establishment of regional educational services to provide more personnel in scarce categories. In various ways states have come together for inter-state community planning—the Southern Regional Education Board, the Western Interstate Commission on Higher Education, and the Northeast

[4] This statement appears repeatedly in the "Definition" portion of various "Titles" of the Social Security Laws.

State Governments Conference on Mental Health. Meetings of these groups provide striking illustrations of the varieties of programs designed to solve basically similar problems.

Tangible evidence of the real potentialities for successful planning of such a group as the Northeast State Governments Conference on Mental Health is to be found in the remarkable legal document known as the Interstate Compact on Mental Health (6) which was conceived and born in this Conference. Extremely difficult legislative and administrative problems, at times thought to be insoluble, were transcended to forge an instrument which has added a great deal for the clinician considering the best interests and welfare of his patient. It is now possible in those states which are signators of the Compact to plan for a patient on the basis of his medical needs rather than on the basis of a legalistic concept of place of residence or settlement.

At the level of the state "community," the problems of planning are compounded. Federal legislation is drawn along broad lines and in accordance with broad general principles to allow for the translation to meet the needs of individual states. Interstate planning too is limited to special circumstances and is framed in general terms. State planning, however, has to deal with the details of program activities in the specific requirements of the individual state.

It is estimated that in 1957 the total operating expenditures for patients in state mental hospitals reached $732.2 million. This represents an increase of 130% in expenditure in 10 years. During this period hospital populations increased by 13.4% and first admissions by 23.7%; discharges increased by 85% but re-admissions increased 100%! State community mental health services from 1952 to fiscal 1957-58 increased from $5.9 million to approximately $27 million(7). These are rough figures introduced only to give some gross factors which need to be taken into account in state planning. The most valid trend these complicated data reveal is the increased movement of the patient population to and from state hospitals and the recently increased expenditure for "community services."

State responsibility has been with few exceptions affixed by practice, to inpatient care. That is, the objective of state hospital programs and hospital administrators has largely been the care of the patient to the point of clinical improvement where he could return to the community. In this context, return to the "community" might include "direct discharge," return to court, prison or jail, discharge against medical advice, unauthorized absence, voluntary separation, or some manner of conditional release. Where hospitals have had clinical services in the community, they were usually available for a percentage of "convalescent status" or "extended visit" patients who remained "on the books." The movement into community mental health services by state government is beginning to change this orientation.

The stimulus of the National Mental Health Act did a great deal to break down the planning isolation of state departments in the mental illness field. Committees and Commissions were developed. Commissioners of Mental Health met with their opposite numbers in Health, Education, Welfare, Corrections, Labor, Finance and others to plan for services in the community. Mutual and related problems have been brought into a common forum. The mental hospital patient in this group is seen in his social context rather than in an acute phase of his illness. The essential problem of relating these to-be-defined services to local voluntary and municipal agencies began to come under discussion. Simultaneously the "open" hospital, long dormant in this country, was given impetus. We are also, with less fanfare, beginning to see an increase in the utilization of the voluntary commitment. It has been said that the "open door" is really the prelude to the "revolving door."

Further planning in fields other than those specifically identified as mental health, needs the guidance and assistance of psychiatrists at the state level. Research under essentially psychiatric auspices has been largely responsible for demonstrating the potential evils of many long-established practices in the care of orphaned infants. Adequate planning of our state child welfare programs in the area of adoption and

foster home practices should have the benefit of psychiatric guidance. These are activities in community planning of major importance to our society as a whole.

Planning is now actively under way for the 1960 White House Conference on Children and Youth. Nationally there are psychiatrists involved in the planning and direction of the conference. The organized psychiatric community at the state level, district branches of the American Psychiatric Association for example, should be active participants in the state's planning for this Conference.

At the local community level there is evidence that efforts(8) of mental health education are beginning to take root. We see this in the interest of local communities and agencies who are approaching our hospitals asking for opportunities to participate in planning for patients who are returning. These approaches are from organized groups such as Councils of social agencies who have an awareness of the problems and are expressing some degree of responsibility for them. We hear reports of programs utilizing public health nurses (Ga., Ky.), County Health Departments (Fla.), and County Welfare Departments (Kan.). There are also continuing efforts [5] to involve the general medical practitioner in various phases of aftercare. The impetus of the Office of Vocational Rehabilitation is beginning to be felt and the Hospital and Community Services Branch of NIMH has also stimulated activity. The various community mental health acts in states have emphasized state-local fiscal participation usually under defined public and voluntary auspices. These resources have undoubtedly resulted in an increase of facilities, so that more service is available to more people. Perhaps it is too soon to inquire or perhaps it is too audacious a question, but we can't help wondering to what extent these services are related to community problems. We are suggesting that the heavy emphasis has been on matters pertaining to organization, *e.g.* financing, personnel, and not sufficient emphasis has been given to planning.

[5] Through the Ad Hoc Committee on General Practice of the APA in Cooperation with the American Academy of General Practice.

Summary

To recapitulate, the necessity for adequate planning is justified not only by current scientific knowledge that indicates its validity, but also by the practical necessity for making the most efficient use of any and all available resources.

When we total our current scientific knowledge we hear that "much of the disability in mental illness is superimposed by social and treatment mechanisms and is preventable and reversible"(9). A review of financing (tax funds supply probably 90% of the budgets for services) tells us that "discussion focuses on assertions that the states have reached their taxing limits"(10). When we examine our personnel picture and the training and recruitment prospects (11) we find that it will take all our ingenuity to stand still. These are sobering and responsibly drawn conclusions. They indicate that we cannot expect more of what we have, without limit. We cannot assume that our currently uncoordinated efforts are making maximum use of existing facilities. We must continue to discover and make creative use of related facilities which can contribute to the solutions of our problems.

This assumes that we have defined our problems in both qualitative and quantitative terms; that we have an appreciation of our resources and that the means of communication exists to consider getting the two together(12). This is a large assumption. Nevertheless it is the only base on which planning can define and consider the issues. The alternative is to continue our buckshot approach of more of the same, in the hope that if some is good, a lot is better.

Planning can start with the individual practitioner out of whatever professional discipline he represents. He is in a position to appreciate the needs evidenced in the individual case. Through his relationship with his colleagues in membership organizations or through hospital and agency structures these individual needs become cumulative and are communicated. (We have herein noted how this chain reaction can move from the National scene to the clinical decision.) As the needs of individuals become clear it is possible to design

and implement services to meet these needs. From private practice case planning up the line to broad program planning, reality factors must be identified and met. The reality variables may well be decisive in determining whether or not our technical skills will have an opportunity to deal with personality pathology or its manifestations !

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HIGH DOSAGE CHLORPROMAZINE THERAPY IN ACUTE AND CHRONIC SCHIZOPHRENIA

R. H. V. OLLENDORFF, M.R.C.S., L.R.C.P., D.P.M.[1]

In a number of "double-blind" studies on chlorpromazine, reviewed by Freeman (1) it was found that the efficacy of tranquilisers like reserpine and chlorpromazine in the treatment of acute and chronic schizophrenia cannot be doubted. Pioneer trials were described by Kinross-Wright (2), D. Goldman(3), and A. A. Kurland (4), and the results of these authorities were confirmed as most satisfactory.

In Freeman's review(1) three dosage schedules are discussed: Low (150–400 mgs. chlorpromazine daily); Moderate (500–900); High (1000 and over daily).

In the last, Kinross-Wright's intensive treatment in rapidly increasing doses (up to 4,800 mgs. daily for 8 to 10 days), is especially relevant to the working out of the method, described below. In his review, Freeman thinks that the results are equally good in all 3 levels but that the figures for chronic schizophrenics are showing a significant increase of successes in the high dosage column.

A. A. Kurland(5) studied the response of 400 cases of schizophrenics to chlorpromazine and reserpine and concluded that chlorpromazine is the superior drug. This, too, was amply confirmed.

Of vital interest for the development of the method called in this trial Intensive Chlorpromazine Therapy was the paper of M. W. Foster and R. S. Gayle, read at the 49th annual meeting of the Southern Medical Association Section for Neurology and Psychiatry in November, 1955, and the consequent discussion of this paper(6). Here it was reported and strongly supported by Ayd(6) that a combined therapy of chlorpromazine and electroshock therapy achieved quick and very good results and that the dangers thought to be great in this combination are, in fact, minimal and easily avoidable, especially if chlorpromazine is not given directly before treatment.

In searching for the optimum therapy in schizophrenia, it follows from the above references that chlorpromazine was preferable to reserpine, that a moderate to high dosage technique had advantages over the low dose and that it was desirable to combine ECT with medication. Thus it was found advisable to:

1. Try to find an optimal dosage of chlorpromazine. The differentiation of dosage for acute and chronic schizophrenics was considered irrelevant. Whatever damage the disease process does in a prolonged course, can have little or no bearing on the disease process *per se*, and the thorough suppression of the disease by forcing an early and lasting remission is of great importance. The combination of chlorpromazine and ECT was thought to be a powerful agent. In a number of single trials ranging from 800 to 3000 mgs. daily, 2100 mgs. daily was found to be optimal as a peak dosage.

2. Try to find an optimal time limit. Maintaining in single trials patients on the peak dosage, varying from one day to one month, it was found that too short a period was not giving lasting benefit, delaying in fact the remission, or being followed by rapid relapses, whereas continuation for too long a period did not alter the picture either in success or failure but made epileptic and pseudo-Parkinsonian side effects very prominent without helping in the process of forcing or maintaining a remission, nor in fact did it seemingly break up psychotic features in the very malignant forms of schizophrenia. Ultimately, a skeleton scheme of the intensive chlorpromazine therapy was evolved (Table 1).

A quick permeation with chlorpromazine parenterally is achieved and accompanied by 3 electroconvulsions, modified by Pentothal and Brevidil. The second step is a daily increase of chlorpromazine by 100 mgs. t.d.s. to the peak dose of 700 mgs. t.d.s., which is held for one week. The dosage is then decreased by 100 mgs. t.d.s. until a level of 300 mgs. t.d.s. is

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TABLE I

BASIC OUTLINE OF INTENSIVE CHLORPROMAZINE THERAPY

	1st day	Chlorpromazine mgs. 50, Intramuscular, or orally t.d.s. or mgs. 100, Intravenously statim followed by 50 mgs. Intramuscularly, t.d.s. according to severity of symptoms for 2 to 4 days until oral therapy possible.
1st ECT	2nd to 4th day	Chlorpromazine mgs. 100 t.d.s. (tabs.), for 2 to 4 days.
2nd ECT	4th to 6th day	" " 200 " " for 2 to 4 days.
3rd ECT	6th to 8th day	" " 300 " (Syrup) for 2 to 4 days.
	9th day	" " 400 " " for 1 day.
	10th day	" " 500 " " for 1 day.
	11th day	" " 600 " " for 1 day.
	12th to 19th day	" " 700 " " for 7 days.
	20th day	" " 600 " " for 1 day.
	21st day	" " 500 " " for 1 day.
	22nd day	" " 400 " " for 1 day.
4th ECT	23rd day	" " 300 " " for 1 day or beginning of maintenance level.
5th ECT	24th day	" " 200 " (tabs.), usual maintenance level for varying times, sometimes permanent.
6th ECT	25th to 35th day	" " 100 " " maintenance dose in favourable cases.
		" " 50 " " after discharge indefinitely.

reached and 3 further modified electroshocks are given.

This is not a rigid scheme and it is guided by the response of the patient and the severity of the side effects. These side effects rarely occur during the period of the build-up of the therapy but if they happen during the peak period the manipulation of the situation leads to an earlier beginning of the descending limb of the therapy.

METHOD

All female first admissions, diagnosed as schizophrenics, most of the female cases admitted and diagnosed as recurrent schizophrenics, a number of male first and recurrent admissions and chronic patients in the male ward and chronic cases from two female wards, under the care of the writer, were chosen. There was no selection, but in the long stay wards the age of the patients was restricted mainly to 20–50 years.

All first and recurrent female admissions were, in the vast majority, in the personal care of the writer from January 1957 until September 1958 and the 143 patients, 93 females and 50 males, were divided into Groups A, B and C, first, recurrent and chronic hospitalized cases respectively (Table 2).

There were 37 first admissions against 106 recurrent and chronic hospitalised schizophrenics: thus a loading with acute illnesses which usually respond to treatment, is avoided (Table 2).

An assessment of the type of schizophrenia has been made, but it was found that only in rare cases was this classical enough to categorise in one diagnostic pattern (Table 3).

In the recurrent Group B and the chronic Group C, all previous treatments, as far as they are recorded in the old case notes, were noted and are summarised in Table 4.

Assessment of the condition of the majority of patients was made by the writer, the remainder by his colleagues. A first regular assessment was made after the patient was stabilized on his maintenance dose, usually

TABLE 2

NUMBER OF CASES AND GROUPING

		Female	*Male*	*Total*
A.	Number of first acute schizophrenic episodes	30	7	37
B.	Number of acute schizophrenic breakdowns after previous remissions	28	22	50
C.	Number of chronic hospitalised schizophrenics (over two years)	35	21	56
		93	50	143

TABLE 3

A ROUGH DIAGNOSTIC SUB-CLASSIFICATION

a = Catatonic Schizophrenia
b = Paranoid Schizophrenia
c = Hebephrenic Schizophrenia
d = Simplex Schizophrenia

	Group A	*Group B*	*Group C*	*Total*
a	4	2	7	13
a + b	3	13	17	33
b	15	26	12	53
b + c	5	4	5	14
c	1	2	2	5
a + c	5	1	3	9
a + b + c	2	2	7	11
d	2	–	3	5
	37	50	56	143

TABLE 4

TREATMENTS PREVIOUS TO INTENSIVE CHLORPROMAZINE THERAPY

	Previous to Intensive Chlorpromazine Group B and C. Number of patients treated.
ECT Straight, Modified or Cardiazol	86
Deep Insulin Coma Treatment	37
Modified Insulin Treatment	20
Small doses of Chlorpromazine or Serpasil	32
Prefrontal Leucotomies	10

TABLE 5

STANDARDS OF ASSESSMENT

I = Recovered	Full social and individual rehabilitation on the premorbid level of personality integration.
II = Good Improvement	Full social integration but less than the premorbid level.
III = Mild Improvement	Full social rehabilitation but still showing elements of former schizophrenic illness.
IV = Minimal Improvement	Arrest of overt psychotic behaviour, ability to be maintained in a sympathetic environment out of Hospital or upgrading inside the Hospital; works, dresses, feeds without supervision, psychiatric supervision necessary on Out or In-Patient basis.
V = No Improvement	Continuation of the schizophrenic disease process with no break-up of psychotic behaviour or any signs of a remission.

after his sixth modified ECT. A firm assessment, of course, was made prior to discharge. Followup was carried out by the writer and his colleagues in all outpatient clinics of the area, and for the more recent admissions, regular followups in this hospital had been arranged by the writer after the discharge of the patients, at monthly intervals (Table 5).

Clinical details of the intensive therapy are of some importance. The patient is usually in bed for the first 2 to 4 days to acclimatize to ward conditions and he is encouraged to be up and about until his ninth day. From the ninth to the twenty-third day he is in bed again because of drowsiness, orthostatic disturbances, epileptic manifestations and occasional confusional states. Severe pseudo-Parkinsonian symptoms such as drooling, speech difficulties, marked limb rigidity with "cogwheel" neuromuscular response to passive movement, myoclonic jerks, epileptic fits, gross malaise with feelings of severe weakness may often make one choose a shorter time or a lower dosage level of the 7 day peak period. Food and liquid intake, bowel and bladder action, are attended to and special care of the heart and lungs is given. A full blood count is taken if any mouth or throat pathology is observed. The activities of patients in bed, like reading, knitting, drawing, conversation with nurses are encouraged but drowsiness in most cases prevents these activities.

After the period of maintenance, not later than 10 days after the last ECT, an assessment is tried to fix the maintenance level which varies from 50 to 300 mgs. t.d.s. It usually depends on the degree of remission. It is, to judge from the experiences of the last 21 months, of primary importance not to be too quick to reduce chlorpromazine or to cut it off altogether by misjudging success, or failure, too early; especially in chronic schizophrenics the rigid maintenance of quite high levels of chlorpromazine, even up to 400 mgs. t.d.s. is part and parcel of the intensive chlorpromazine therapy.

The results of this trial are given in Table 6 and the administrative outcome is assessed in Table 7 together with the fate of 16 relapses.

Side effects are tabulated in Table 8.

Discussion

1. The combination of intensive chlorpromazine therapy and ECT has been thought dangerous by some authorities. Freeman(1) mentions a number of serious complications and deaths and states that this method should be used with great caution. Goldman(7) feels that chlorpromazine is no contra-indication to ECT, criticising the authors for not stating their methods of giving ECT, but he maintains that no muscle relaxants should be given. In our experience, there is no danger or contra-indication in either the combination or the giving of muscle relaxants. In this trial a minimum of 900 electroshocks have been given to patients before and after the peak period, usually at the level of 900 mgs. per day chlorpromazine, and in no case was there an difficulty in the recovery. The standard method used was as follows:

Pre-medication with atropine, half-an-hour before treatment, no meals 3 hours before treatment, bladder and bowel emptied before treatment, 3–5 cc. of 5% solution of Thiopentone, 0.5–1 cc. Brevidil, the last two given through the same needle but in two syringes, oxygenation of the patient until full relaxant effect has been observed, shock, oxygenation at the tail-end of clonic phase of convulsion until full breathing established.

The only observation during these treatments was the marked prolongation of the clonic phase when ECT was given following the peak period. This is also seen after deep insulin coma treatment and is not considered relevant.

2. During the single trials to estimate optimal dosage, epileptic fits of classical grand mal character were observed regularly in dosages over 2100 mgs. per day. In 3 cases of failure after the peak period, using the above method, treatment was recommenced by raising the dosage to 3000 mgs. per day, and all 3 cases had fits. However, a further 17 epileptic fits occurred during the 2100 mgs. per day level. In these cases, 7½ grs. sodium amytal were given intramuscularly and the descending limb of the therapy began irrespective of the length of time of the peak period maintained. As in deep insulin coma treatment,

their occurrence should not lead to disruption of the therapy.

3. The confusional state reported in 15% of all patients occurs usually near or during the peak period. It is often quite out of tune with the underlying psychosis, in fact, it is a superimposed toxic psychosis. In most cases there is gross restlessness, over-activity, over-talkativeness, speech is found to be incoherent and the contents have little bearing on the pre-existant primary delusions; in some cases gross euphoria and episodes of manic character were observed. Here the danger consists in diagnosing a relapse and breaking up the therapy. It was found in all cases that sedation with sodium amytal, again given intramuscularly, with a dosage of 7½ grs. alleviated this state and was given concomitantly with the chlorpromazine therapy.

4. Jaundice and agranulocytosis were constantly watched for, but did not appear in any of the 143 patients. Three cases, 2 females and 1 male, had mild jaundice previous to intensive chlorpromazine therapy when on small doses of the drug.

5. Two chronic deteriorated schizophrenics committed suicide after lengthy periods of maintenance dosage. Their suicides were not thought be be related to the action of chlorpromazine, but they must, naturally, be regarded as therapeutic failures.

In view of the fact that side effects with chlorpromazine are encountered regularly, the method described above is not blind. It follows, therefore, that the observations made are subjective ones, but the following points emerge:

1. Intensive chlorpromazine therapy is a useful method of forcing a remission in primary schizophrenic episodes. It works at least as well as other methods of treatment in primary schizophrenia, with the exception of simple schizophrenia and the few

TABLE 6

RESULTS OF 143 PATIENTS AFTER INTENSIVE CHLORPROMAZINE THERAPY

	Acute First Schizophrenic Episode				*Acute Schizophrenic Breakdown after Previous Remission*				*Chronic Hospitalised Schizophrenics*				*Totals*	
	Fem.	*%*	*Male*	*%*	*Fem.*	*%*	*Male*	*%*	*Fem.*	*%*	*Male*	*%*		*%*
I (Recovered)	14	38	1	3	7	14	2	4	–	–	–	–	24	17
II (Good Improvement)	10	27	3	8	11	22	10	20	4	7	2	3.5	40	28
III (Mild Improvement)	4	10	3	8	9	18	9	18	15	26	6	10.5	46	32
IV (Minimal Improvement)	1	3	–	–	1	2	–	–	12	21	11	20	25	17
V (No Improvement)	1	3	–	–	–	–	–	–	3	6	2	3.5	6)	6
VI (Suicides)	–	–	–	–	–	–	1	–	1	2	–	2.5	2)	–
	30		7		28		22		35		21		143	

TABLE 7

ADMINISTRATIVE OUTCOME

	Discharges in this Hospital		*Transfer or readmission to other Hospital*	
	Discharge		*Remain*	
Out of 37 (Group A) First Admissions	35	(94%)	2	(6%)
Out of 50 (Group B) Recurrent Admissions	44	(88%)	6	(12%)
Out of 56 (Group C) Chronic Hospitalised Patients	20	(35%)	34	(65%)

	Relapses	*Re-Discharged*	*Still Remain (inc. in the above 'REMAIN' Column)*
GROUP A	3	1	2
GROUP B	8	5	3
GROUP C	5	2	3
	16	8	8

cases of extraordinary malignant catatonic schizophrenia who relentlessly deteriorate in spite of all known treatments; 4 out of the 6 patients, 2 males and 2 females, belong to the latter, the remaining 2 were diagnosed as schizophrenia simplex. Severe longstanding paranoid schizophrenics, even if admitted to hospital for the first time or after long intervals, have been found to need very prolonged treatment on high maintenance levels up to 400 mgs. t.d.s. for as long as 6 to 12 months.

2. Intensive chlorpromazine therapy seems to have the same positive effect with recurrent cases, Group B. The relapse rate in this group was higher than in the other groups, as one would expect for both medical and social reasons; 8 relapses out of 50 patients, respectively out of 44 discharges, were recorded, but a repeat course of intensive chlorpromazine therapy was given in all these cases with equally good results, that is, 5 have been re-discharged after the second course.

3. Less spectacular in numbers, but of perhaps the greatest importance, are the results in the treatment of chronic hospitalised schizophrenics. If a discharge rate of 35% could be reached on a national level it would certainly relieve the pressure on our mental hospitals considerably. One must understand clearly, however, that in the rehabilitation of chronic schizophrenics, and this is probably equally true for primary and recurrent patients, modern hospital conditions with maximal freedom, occupation, enlightened nursing, maintenance of the patients' social relations, play a preponderant part. This is obviously difficult to assess but may be of greater significance than even the best medication.

4. In one patient of Group A, intensive chlorpromazine therapy did not force a full remission and although maintained on

TABLE 8

SIDE EFFECTS

Side Effects	*Females*	*Males*	*Total*	*Percentage*	*Special Medication Given*
Drowsiness	85	41	126	88	—
Pseudo-Parkinsonism	51	21	72	51	Reduction at maintenance level only.
Skin reaction—Oedema, Sweating, Flushing	28	3	31	21	Cortisone Cream when severe. Nivaquine 200 mgs. b.d.
Epileptic Fits, myoclonic jerks	16	4	20	14	7½ grs. Sodium Amytal Intramuscularly.
Menstrual disturbances in relevant age	34	—	34	36% of all females	In one case, a false positive Freedman test was seen.
Hirsuties	1	—	1	—	
Pseudo-lactation	2	—	2	—	
Confusional State	13	9	22	15	7½ grs. Sodium Amytal Intramuscularly.
Pyrexia	7	5	12	8	As usually concomitant with hypostatic pneumonia—Penicillin given in usual dosage—Chlorpromazine reduced pro tem.
Epistaxis	—	1	1	—	Reduction of dosage temporarily.
Obesity	41	8	49	34	—
Skin reaction—sun irritation	37	15	52	36	Nivaquine 200 mgs. b.d. Anthisan Cream—Sun hats when up and about.
Jaundice	—	—	—	—	—
Agranulocytosis	—	—	—	—	

chlorpromazine 300 mgs. per day, it was felt that the patient was relapsing. At that point, deep insulin coma therapy was given and a good remission was forced with 38 comas. She has been maintained since then, for over a year now, on chlorpromazine mgs. 150 per day and has not relapsed and was assessed when last seen as an outpatient, as maintaining her good improvement. From a comparison of recurrent and chronic patients who had leucotomies, and those who had deep insulin coma treatment, it became clear that all cases leucotomised responded indifferently to intensive chlorpromazine therapy, whereas a response to ICT after deep insulin coma therapy was significantly better. It is thus felt that deep insulin coma therapy can be adjunctive in achieving a remission.

5. It is well understood that discharge from hospital is not necessarily a good criterion of clinical change, *e.g.* some voluntary patients left hospital prematurely and against advice, whilst other long-stay patients could have been discharged if social circumstances had allowed them.

6. All in all, the response to this method of treatment surpasses the expected rate of natural remissions and it proved successful in patients who were unsuccessfully treated by other methods.

This is most forcibly expressed in considering the response to intensive chlorpromazine therapy of the long-stay chronic illness Group C. Of these 56 patients, 44 had had ECT, straight, modified or Cardiazol, 28 low dosage chlorpromazine or Serpasil, whilst 21 had received deep insulin coma treatment, 13 modified insulin treatment and 8 had prefrontal leucotomy. None had been considered well enough to be discharged. Following intensive chlorpromazine therapy, however, 20 were discharged (6 classified as Grade II, 14 as Grade III).

7. All 16 relapses were associated with failure of the patient to continue on chlorpromazine in the maintenance dose. It cannot be overstressed, that a schizophrenic in remission is not cured; rigid psychiatric supervision and upkeep of an optimal maintenance dose of chlorpromazine are part and parcel of ICT. It is felt that much more knowledge of the disease is needed before we can allow a patient to go without a medication which we know helped him to force and maintain a remission.

Summary

A method is given here where increasing doses of chlorpromazine are given to all groups of schizophrenics, reaching a peak level of 2100 mgs. per day for one week. This dosage is decreased and after assessment a maintenance level of chlorpromazine is rigidly upheld for indefinite periods. Three modified ECTs accompany the ascending limb and 3 or more modified ECTs the descending limb of chlorpromazine therapy. Side effects are multiple but none is considered dangerous or necessitating the discontinuation of the treatment, especially if all necessary precautions are taken and the patient is closely watched.

The results of this method are sufficiently encouraging to justify its continued use.

The method is not considered rigid and the level of dosage and the length of time in which higher dosage levels are given are guided, naturally, by the patient's response and the severity of the side effects. The importance of the method is felt to lie in the quick way a first remission is forced, recurring episodes and relapses reversed and chronic schizophrenic illness alleviated.

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RECOVERY FROM SEXUAL DEVIATIONS THROUGH OVERCOMING NON-SEXUAL NEUROTIC RESPONSES [1]

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The treatment of sexual deviations is commonly said to be difficult and the results uncertain(1, 2). Several popular generalizations about psychotherapy may contribute to these unfavorable aspects of the treatment of these disorders. On the grounds that it takes only one white crow to prove that all crows are not black, we present 3 cases of sexual deviation in each of which a significant transformation of sexual behavior occurred with comparatively little treatment, at least as judged by the number of interviews, respectively 45, 10, and 21. From our data we shall infer that the following popular generalizations are untenable as generalizations: (a) that a requirement of recovery from a psychoneurosis (of which sexual deviations are considered one type) is the recall of repressed memories of early traumatic experiences; (b) that such recovery can only occur, or be lasting if it should occur, as a result of the uncovering and modification of specific sexual conflicts; (c) that the removal of symptoms or the alteration of outward behavior without modification of such conflicts must inevitably lead to the outbreak of other symptoms, if not the recurrence of the old.

CASE REPORTS

Case 1.—A. K. was arrested by the police on the complaint of his neighbors that he had been manipulating the genitals of little girls. One of these neighbors had tolerantly agreed and arranged that the charges would be dropped on condition that A. K. seek psychiatric treatment. He agreed to this with some misgivings.

He had been playing with the genitals of little girls regularly for 3 years, sporadically for many years. Married 10 years, he was the father of 2 girls with whom, incidentally, he did not play sexually. His sexual relations with his wife had once been satisfactory, but had fallen off in later years. He had gradually become almost completely impotent with his wife.

Although 42 years old, A. K. continued in a most servile relationship towards his father who gave him advice and financial donations, but also scorn and derision. Towards his customers he was equally unassertive. He said of himself "I want people to like me. I can never say 'No.'" Originally he had a good relationship with his wife, but as he failed to advance in work or money, they drifted apart and she gradually became irritable and even shrewish towards him. He had gradually withdrawn from her.

Of A. K.'s early sexual history almost no information emerged. In an early interview he mentioned that when he was 5, some boys and men had given him marbles for performing fellatio on them. Other details of early sexual experiences were not pursued; first, because the patient himself had much pressure to talk about his present situation, and secondly, because theoretical considerations presented elsewhere(3, 4, 5) made it seem unlikely that they would be necessary for the patient's recovery. This inference proved correct.

A. K.'s father had at first agreed to pay for his therapy, but after the alarm of A. K.'s arrest abated he treacherously withdrew his support. A. K. wanted to leave therapy, but was detained by the fear that the district attorney would bring him to trial. So he paid for his therapy himself, 45 interviews over a year and a half.

The defection of his father when A. K. most needed him brought fully into the open his child-like attitude which had persisted toward his father. He began to remedy this state of affairs, first, by freely expressing his resentment towards his father for the latter's mistreatment of him over the years, and secondly, by completely emancipating himself from dependence on his father for money, advice or anything else. The assumption of responsibility for paying for his own treatments signalized this change, but was actually only the first of such moves.

The subsequent therapeutic interviews were largely occupied in examining and improving

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A. K.'s current relationships with other people. A. K. gradually became more assertive in such relationships. His relationships with others, including his father, improved markedly. He changed and improved his job and greatly expanded his social activities. His relationship with his wife, especially improved and he found a complete return of his potency with her. At the same time, the desire to play with little girls receded and did not return. Further descriptions of the technique of psychotherapy have been published elsewhere (3, 4, 5).

Three follow-up inquiries were made 1, 5 and 6½ years after the completion of treatment. On each occasion he reported himself as having maintained his improvement, with no recurrence of his deviant sexual behavior.

Case 2.—S. E. was a 22-year-old student who referred himself for the treatment of homosexuality. He was also anxious, depressed and performing poorly in his college work. He had begun homosexual experiences at the age of 14 and continued them for the next 8 years. He also masturbated frequently. His relationships with girls had been meager and unsatisfactory, both emotionally and sexually. He had had sexual intercourse only 3 times with girls during the 8 years of his homosexual activity. At the time of coming for treatment, he had been seeing a good deal of a girl to whom he felt considerable attraction and was even vaguely contemplating marriage to her. He was held back first by the thought that he was using marriage as a possible cure for his homosexuality, and secondly, by the conclusion he had reached that he was irreversibly homosexual and unfit for marriage. Therapy seemed a last possibility before resigning himself to this fate.

No information was elicited about S. E.'s early sexual experiences. His father had died when he was 12 and his mother had remarried 2 years later. The patient's stepfather proved a tyrant who tried to control the family, including the patient, by restrictions on money. He somehow gained control over a small undistributed legacy the patient's father had left him. Instead of having a regular allowance, the patient had to go to his stepfather each time he needed money.

Only 10 interviews took place. The discussion of S. E.'s homosexuality (after the history-taking) was confined to the therapist's offering two remarks with regard to it. First, he said that he thought S. E. had perhaps been premature in assigning himself to the group of permanent homosexuals. Then he suggested that as the patient's father had died when he was young and as his stepfather was such an unsympathetic person, perhaps S. E.'s homosexual activity was chiefly driven by a wish for friendly companionship with other men. These comments reduced the anxiety and shame he felt about his homosexual activities.

The therapist tried to instigate more assertive behavior on the part of S. E. towards his parents, especially his stepfather; this the patient soon developed. Against his stepfather's advice he persisted in purchasing a second-hand car he wanted. This was a turning point and other similar triumphs followed. S. E. soon became more ardent in the courtship of his girl friend. After only 10 interviews and just as the therapy seemed to be getting properly under way, S. E. announced that he now felt entirely well and capable of handling his affairs; that he planned to get married shortly, and saw no reason for further treatment. At this point, the therapist had understandable reservations about the future course of events in this patient's life.

Follow-up interviews took place at intervals of 8 months, a year and not quite 3 years after the termination of therapy. S. E. had married and was getting along very well with his wife. His sexual relations with her had been entirely satisfactory from his point of view, although not at first for her. About a year after the marriage his wife had given birth to a baby. The patient had continued to emancipate himself from his parents. He had forced his stepfather to process his father's estate and also to put advances of money given to him on a sound basis as money borrowed against his legacy and not "hand-outs" at the pleasure of his stepfather. His work at college and his interest in it had improved markedly.

For the first 2 years of his marriage he had heterosexual relationships with his wife exclusively. Early in the third year of the marriage his wife became ill for several months and during the abstinence this occasioned, he had 4 homosexual experiences. When his wife recovered they resumed intercourse which improved further and became enjoyable to her as well as to him. The patient reported far greater pleasure in his sexual relationships with his wife than he had experienced in his homosexual relationships.

Case 3.—E. R., a 32-year-old Swedish hairdresser, was first seen in April, 1954. Seven years previously he had become aware of a slowly progressive diminution in his general enjoyment of life. He emigrated to South Africa early in 1952 and soon after began to suffer

a persistent feeling of tension combined with a varying amount of depression. Over the next 2 years he was treated unsuccessfully by several psychiatrists who gave him ECT, injections of vitamins and some psychotherapy.

The patient was born in a small town in Sweden. His father was amiable, but passive. His mother was an ambitious and querulous woman who complained of her son's stupidity, often screaming at him and beating him. She treated him like a girl, even forbidding him to play football. He grew afraid of her.

At the time of puberty, E. R. found himself attracted to men, although at first more socially than sexually. As he became older, he experienced no sexual attraction for women and when they occasionally made advances towards him became extremely anxious and experienced no sexual arousal. In contrast, he found pleasure in a succession of attachments to men with whom he had sexual relations. But he thought homosexuality sinful and shameful. Failure to master his homosexual impulses led to mounting anxiety from which (and from familial stresses) he sought relief by emigrating when he was 30.

The patient's reactions in many common social situations were extremely fearful and submissive. If a customer made an unjust criticism of him he would let her get away with it and merely feel helpless and tearful.

The 5 anamnestic interviews did not discover any causal sexual trauma, did not elicit any emotions of marked intensity, and were not accompanied by any change in the patient's condition.

The interviews of the next 2 months were devoted to encouraging assertive behavior for overcoming his social fears. He soon became much more positive in all his behavior. By the end of June his symptoms had almost completely disappeared and he was nearly always at ease with his customers. In the meantime, he had formed a couple of homosexual attachments, each of which, although satisfying while it lasted, had petered out in less than a month. Late in November, 1954 he reported complete freedom from symptoms.

He was not seen again until June, 1955, and then told the following story. He had given up worrying about the sexual problem and had been doing just what he pleased. In November, 1954, he had formed a pleasant homosexual association, but soon found himself unable to respond sexually. He broke off the relationship for a time, but when he resumed still could not respond sexually. He tried sexual relationships with several other men with repeated failure. He became antagonistic towards men and said, "If a man were to touch me, I would hit him."

About the middle of 1954 he had met a girl called Jean to whom he became attracted. He began to take her out and found her company pleasant. One night, after a party when they were both slightly drunk, he kissed her and found this pleasant. He then began to respond more and more to her sexually, and thought that he could have had coitus with her. Unfortunately, his inexperience led him to mishandle Jean and when he was seen in July, 1955 he reported that she had rejected him. He was consequently soon leaving for England on his own. There had been 21 interviews of therapy.

In January, 1956 he wrote a letter from London. He said that after he had had dinner at a woman's apartment, she suggested that he spend the night with her. Although strongly attracted, he felt very much afraid and excusing himself, got up to go home. But when he opened the front door it was raining heavily. He decided to go to bed with her and risk the chagrin of failure. To his delight, however, his sexual performance was completely successful. At the time of writing he had made love to this woman almost every night for a month, always with complete success, and with greater enjoyment than he had ever experienced with men. He was jubilant. He regarded this as his final vindication, feeling that he need now never again feel inferior to other men. Exclusively heterosexual behavior continued. In March, 1959 he wrote that he had married in January and his sex life had continued in every way satisfactory.

Discussion

We think the data adequately show that these patients had established patterns of sexually deviant behavior which were succeeded by normal patterns of heterosexual behavior which were not mere transient changes since they remained established for the periods of our follow-up inquiries. How these changes came about requires an explanation.

The role of learning in determining adult sexual behavior

The patterns of adult sexual behavior are learned expressions of the sexual drive. Experiences with persons resembling those who are later to become the objects of sexual impulses may importantly influence their expressions. In a boy, experiences

which are pleasurable with women (beginning with the mother) will tend to promote women as sexual stimuli. Social training and the assignment of social roles based on anatomical sexual differences contribute greatly to deciding the stimuli to which sexual responses will occur. But such social training is also a conditioning process, although a highly complex one, and not fundamentally different from the conditioning which occurs in the more individual experiences of the growing child within his family. Formative experiences capable of influencing the selection of stimuli to sexual pleasure may, and usually do, occur chiefly in childhood. However, they may occur later and we have insufficient grounds for thinking that childhood experiences are the only relevant ones or even always relevant in this connection(6).

In some circumstances, the sexual response towards a particular person or kind of person may be diminished while some sexual desire remains and is stimulated by other persons. If a boy or man finds women frightening to him, the anxiety they arouse may inhibit whatever sexual response they would simultaneously stimulate. Other persons such as small children (Case No. 1) or other men (Cases No. 2 and 3) may still stimulate sexual responses. Such stimulation by persons of the same sex may become further augmented by the play of other motives, *e.g.* a wish for companionship or for power. Ovesey has described the operation of these motives in promoting homosexual behavior as "pseudo-homosexuality"(7, 8). Our case No. 2, and several of Hadfield's cases(9), apparently sought men because these offered companionship and affection which they could not easily obtain elsewhere. However, such non-sexual attractions, like the sexual ones which accompany them, are influenced by the conditioning experiences which make men stimuli of pleasure when women stimulate anxiety.

THE PROCESSES OF CHANGE IN THE SEXUAL BEHAVIOR OF OUR CASES

Most people discover for themselves that if you stand up to a bully he becomes a pygmy, whereas if you run from him he becomes a giant. This principle deserves better understanding and acceptance in psychopathology. An explanation of its effectiveness in terms of learning theory has been proposed elsewhere by one of us(4). Moreover, though generalization, an assertive response towards one person may reduce the capacity of other persons to stimulate anxiety. In the 3 cases reported here, the patients had anxiety stimulated by women, and this was accompanied by diminished sexual responses to them. When the patients developed assertive responses toward other people, their susceptibility to the arousal of anxiety became lowered so that the sexual stimulation of women was no longer outweighed by their stimulation of anxiety. Thus, the basic preference for women established early in life by social roles and other learning could now assert itself. The further experiencing of full sexual pleasure with women then reinforced the capacity of the women to stimulate sexual pleasure and the changed pattern of sexual expression was thus consolidated.

SEXUAL DEVIATIONS THAT ARE DUE TO ANXIETY ORIGINATING IN SEXUAL EXPERIENCES

We do not mean to imply that sexual experiences are never specific in the origin or removal of sexual inhibitions and deviations. The connections between anxiety and sexuality are specific in some cases, general in others, and perhaps of both kinds in still others. For example, if a mother arouses anxiety in a child during his sexual excitement (perhaps also stimulated by a women, as in one of Hadfield's cases) sexual responses may be markedly inhibited while other responses remain uninfluenced.

Supposing that specific connections have been established between sexual responses and the arousal of anxiety, what can be done to alter these? Herzberg(10) assigned to homosexual patients series of graduated tasks designed simultaneously to reduce the anxiety aroused by women and increase the pleasure they evoked. Salter (11) has reported success in the treatment of homosexuality by the instigation of assertive behavior according to a theory and practice somewhat similar to our own. In the treatment of impotence with specific

connections between sexual responses and anxiety, one of us (J. W.)(4) has found successful the use of graded sexual responses controlled by the patient so that anxiety is not aroused by failure. As we mentioned earlier, Hadfield found beneficial effects in the recall of events which had apparently originally established the connections between sexual responses and anxiety. This brings us to the mechanism of action of such recall.

A CRITICISM OF CURRENT VIEWS ON THE THERAPEUTIC EFFECTS OF RECALLING PAST EXPERIENCES

The recovery of repressed memories and the uncovering and interpretation of specific sexual conflicts contributed nothing to the recoveries of our patients because these did not occur in the therapy or, so far as we know, outside it. This point deserves emphasis because Hadfield, on the basis of his observations in the treatment of homosexuality, has recently stated that his patients "were cured when, and only when, their propensities were traced back to infantile experiences"(9). Evidently, the recall of past painful events may contribute to recovery. A long line of cases extending from the early ones of Breuer and Freud(12) to those recently cited by Hadfield attest to this.

Hadfield attributes the benefits of this recall to the "release of repressed emotion" and in this is, of course, a modern spokesman for the traditional psychoanalytic theory of abreactions. However, it is doubtful (although not impossible) that emotions continue after what is called repression in a state of activity pressing towards expression. The popular analogies of such emotions to steam in a bottle are more picturesque than explanatory. We do not question the fact that anxiety can contribute to amnesias, only that the anxiety (or other "repressed emotion") is constantly welling up towards the surface of behavior. Davis(13) has pointed out that memory images are perceptions just as are those caused by current people or objects, and we respond to the stimuli in memories just as we do to those in other perceptions. The recall of a scene once painful can then evoke anxiety not as an old de-repressed emotion, but in response to the stimulus for anxiety occurring in the immediate perception. Thus memory of the cruel mother may stimulate present anxiety rather than release old anxiety. This distinction is worth making because it bears on the process by which stimuli lose their capacity to evoke anxiety, so-called desensitization. This occurs if and probably only if the stimuli for anxiety are evoked in association with other stimuli which evoke non-anxious responses(3, 4).

Desensitization can occur by thinking alone under certain circumstances. Thus as a person ruminates some unpleasant event, he may bring into association with the memory images of the event, other thoughts which arouse other emotions that neutralize anxiety and so neutralize or antagonize the tendency of the event to stimulate anxiety. The process of desensitization through reassociation of a painful event proceeds better if the patient verbalizes the event and its associations to another person, usually a therapist. Desensitization to anxiety-producing stimuli may also occur in other ways than through the recall of past experiences. For example, it may be obtained by the systematic presentation of graded present-day anxiety evoking stimuli to the deeply relaxed patient(4).

Once freed from the concept of "repressed emotion" we become able to accept the fact that a psychogenic symptom can be modified or abolished without another appearing in its place(14). From the fact that anxiety is experienced when past traumatic events are recalled, Freud assumed that repression was a defense against anxiety and that symptoms were partial expressions of the repressed emotions and at the same time also defenses against the original emotions. These views became generalized without correction in the conventional literature of psychoanalysis so that nearly every psychogenic symptom came to be considered a defense against anxiety. It followed from this that any attempt to modify symptoms directly was at best a superficial tinkering and at worst, fraught with the danger of detonating a more serious illness. Yet the literature of psychiatry contains numerous instances of

the treatment and most beneficial removal of symptoms with conditioning techniques without the occurrence of other symptoms or any other adverse effects(4, 15, 16, 17, 18). Moreover, we have abundant evidence that many patients recover from psychoneuroses without psychotherapy(19, 20) and presumably without de-repression. Some neurotic responses clearly have defensive value for the patient, *e.g.*, social withdrawal to avoid persons who stimulate anxiety, and such responses cannot be stopped without arousing anxiety. But other symptoms are results or concomitants of anxiety. Most psychoneurotic symptoms are simply learned unadaptive responses and their unlearning usually includes a reduction in anxiety in that stimuli which formerly evoked anxiety no longer do so.

Summary

1. Three cases of sexual deviation are reported in which a return to normal heterosexual behavior followed the development of assertive behavior on the part of the patients. Follow-up inquiries 3 to 6 years later showed that the patients had maintained their improvements.

2. In these patients the sexual deviations were determined by anxiety that did not have a sexual origin. The processes of their therapy are discussed, and also, more briefly, the therapy of those cases in which anxiety is specifically attached to sexual stimuli.

3. The recoveries in these patients were not related to recall of repressed memories of traumatic events or the working out of specific sexual conflicts. The alteration of sexual behavior did not lead to the occurrence of other symptoms or other undesirable side effects.

4. The processes whereby stimuli of anxiety lose their capacity to arouse anxiety are discussed and it is suggested that the concept of "repressed emotion" has hindered an understanding of the processes of recovery from psychoneuroses with and without psychotherapy.

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CLINICAL NOTES

STUDIES ON THE NEUROCHEMISTRY OF SCHIZOPHRENIC AND AFFECTIVE DISORDERS

SAMUEL BOGOCH, M.D., PH.D.[1]

The earlier demonstration in this laboratory(1c, 1d, 4) of an abnormality in the concentration of "total neuraminic acid" in cerebrospinal fluid (CSF) in schizophrenic patients led to the development of quantitative fractionation procedures(1b, 1e) for the separation and measurement of the macromolecular hexoses and hexosamines of CSF as well as of neuraminic acid (Fraction G).

Table 1 shows the range and means of concentration of these substances in 236 individual CSF samples. Both the absolute quantities and the molar ratios of these constituents have been shown to vary markedly from individual to individual(1b). The relevance of these findings on central nervous system constituents to functional states of the nervous system as well as to possible chemical bases of individuality is now being studied.

Table 1 shows that the absolute concentration of macromolecular (bound) neuraminic acid in schizophrenic patients as a group is lower when compared to non-schizophrenic mental hospital patients, and to general hospital adult controls. Values are also lower for bound hexosamine in untreated schizophrenic patients. On the other hand, the concentration of bound hexose is approximately the same in schizophrenic patients as in controls and in patients with depressive disorders. Higher than usual values have been observed in both the bound hexose and hexosamine of patients with manic psychoses, and in bound hexosamine alone in chronic brain syndromes.

Repeated double-blind determinations over a period of months on individual patients of these substances show that there is a definite tendency to constancy in both their absolute quantities and in their molar ratios, but that with gross changes in function there are concomitant changes in these carbohydrate constituents in macromolecular binding. Thus, in the change from depression to the normal affective state and to elation, whether it occurs spontaneously, with an antidepressant drug, or with electroshock therapy, an increase has been observed in the absolute amount of macromolecular hexose and hexosamine ranging from 46% to 510%. Similarly, in the reverse change, from the hypomanic to the depressed state, the opposite change in macromolecular hexose and hexosamine has been observed, that is, a decrease in the absolute concentrations of these substances. With treatment, schizophrenic patients have shown up to 400% increase in the concentration of bound hexosamine, but very much less change (usually an increase) in the concentration of bound hexose and neuraminic acid. (Table 1.)

Recent evidence from this laboratory relative to the concept of the "Barrier-Antibody System"(1c, 1d) function of neuraminic acid in the nervous system includes: 1. The demonstration of a serum precipitin to the neuraminic acid-containing brain ganglioside(1a), which has been utilized to localize brain ganglioside in the nerve cell body by the fluorescent antibody technique (1g); 2. The activity of brain ganglioside as membrane receptor (for viruses)(1f, 3); and 3. The effect of this substance on membrane-active systems (clam heart)(2).

The possible biosynthetic relationship of hexosamine to the more complex structurally related derivative neuraminic acid, considered in relation to the evidence on their 'maturation' in CSF(1b, 1c) and to the above findings on their macromolecular concentration in different psychiatric disorders leads to the formulation of the working hypothesis that there is an enzymatic

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TABLE 1

CONCENTRATIONS OF MACROMOLECULAR (BOUND) HEXOSE, HEXOSAMINE AND NEURAMINIC ACID IN CSF OF PSYCHIATRIC AND GENERAL HOSPITAL PATIENTS

Diagnosis	*Fraction G*					
	Hexose, μg/cc. CSF (as glucose)		*Hexosamine, μg/cc. CSF (as galactosamine)*		*Neuraminic Acid μg/cc. CSF*	
	Mean	*Range*	*Mean*	*Range*	*Mean*	*Range*
1. Schizophrenia, untreated	19.0	(4.0-50.5)	8.3	(1.8-24.2)	5.1	(2.3- 8.6)
2. Schizophrenia, treated	22.0	(7.0-54.5)	16.0	(3.2-44.6)	6.2	(2.7-10.1)
3. Other (than 4, 5 and 6) Mental Hospital	26.8	(5.5-81.2)	8.5	(1.6-15.0)	7.8	(3.3-17.2)
4. Chronic Brain Syndromes	20.5	(11.0-31.0)	23.1	(5.1-60.0)	8.3	(4.4-11.9)
5. Manic Psychoses	72.2	(51.6-88.0)	32.5	(9.0-57.0)	–	
6. Depressive Psychoses	19.6	(14.5-31.0)	13.6	(6.2-18.8)	11.0	(5.5-15.1)
7. General Hospital	22.5	(7.0-55.0)	13.5	(8.3-17.8)	10.6	(9.0-13.4)

disturbance in the synthesis or maintenance of both macromolecular hexosamine and neuraminic acid in schizophrenia, and that the first may be reversed (indeed 'over-compensated for') with therapeutic means at present available, but that the second is at present refractory.

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RESERPINE AS A THERAPEUTIC AGENT IN SCHIZOPHRENIA

MANFRED BRAUN, M.D.[1, 2]

Despite much progress in the treatment of mental patients in recent years there still remain many patients who are unresponsive to various treatments.

Remembering Barnes and Kline's(1) earlier work on the subject and Braun's experience(2), we have used reserpine over a 2-year period at the Bronx VA Hospital for just such treatment resistant patients. Twenty eight male patients, aged 22 to 54, were selected for the study. All were schizophrenics with pronounced symptoms of mania, excitement, negativism or periodic stupors. All were new admissions to the hospital but with a long history of mental illness. The patients served as their own controls. All had been previously treated with various phenothiazine drugs and 9 also had received ECT, insulin coma therapy or both combined. None of the patients had responded to therapy.

The patients were given 3 mg. of reserpine orally once daily and 5 mg. of reserpine intramuscularly once daily for 10 days, then slowly increasing up to 10 mg. daily intramuscularly for 20 more days if their response to the drug was not too favorable. If the response was favorable, the 5 mg. intramuscular dose was maintained for 20 to 30 days, then gradually decreased to a

[1] The following residents in Psychiatry at the Bronx VAH participated in this study: Bertram Barall, M.D.; Herbert Bengelsdorf, M.D.; Adolph Goldman, M.D.; and Harvey Ross, M.D.

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maintenance level of ½ to 2 mg. orally once a day.

The usual precautionary measures were taken: temperature, pulse rate and blood pressure were done twice daily during the first week, and WBC was done biweekly. All patients received supportive psychotherapy and occupational therapy whenever their conditions permitted.

Sixteen patients (57%) improved very much so that they could be either discharged or sent to an open ward. Five patients (18%) became much more manageable but could not be discharged. Seven patients (25%) remained unimproved or became worse and had to be transferred to a chronic hospital.

All patients were evaluated clinically by psychiatrists and nurses.

There were the usual side effects in the majority of patients: nasal stuffiness; dryness of mouth; increase of appetite; somnolence; and about 25% of the patients developed marked Parkinsonian tremors with rigidity, characteristic gait and salivation. The medication was not given to any patient with a history of peptic ulcer or bronchial asthma, the usual contraindications for reserpine therapy. Side effects were easily controlled with the usual medications *e.g.* trihexyphenidyl (Artane) or benztropine methanesulfonate (Cogentin). In no case was it necessary to discontinue treatment permanently with reserpine because of side effects.

SUMMARY

The rapid and dramatic response of schizophrenic patients to treatment with the phenothiazines has resulted in a tendency to discard reserpine as a chemotherapeutic agent in this illness. Our experience suggests that there is a place in the therapeutic armamentarium against schizophrenia for reserpine, particularly in those cases displaying catatonic excitement or stupor with agitation and in those with manic features, especially when these patients fail to respond to the phenothiazines, ECT or insulin coma therapy.

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TRIALS WITH SEVERAL NEW DRUGS

MICHAEL J. KEITH, M.D.[1]

This is a brief note upon the use of the "newer" anti-depressant drugs in a private psychiatric practice over the past six months. The drugs used have been the MAO inhibitors and imprimane. The doses used varied from 3 to 24 mgs. a day of Catron, 50 to 300 mgs. a day of Niamid, 15 to 75 mgs. a day of Nardil and 50 to 300 mgs. a day of Tofranil.

These drugs were tried as an initial treatment measure in approximately 50 patients. They were in the usual clinical groups of depressions ranging from psychoneurotic depression, manic-depressive reactions in depressed phases, schizophrenic reactions with depression, and involutional psychotic reactions of an agitated depressive type.

The results have been in the main extremely disappointing. There appeared to be little significant action beyond placebo effect, the majority of the patients have experienced no relief of their depressive symptoms though gratifyingly there have been extremely few side effects of a troublesome nature.

About 4 or 5 patients have shown a good "response." Three of these have been on Tofranil (a manic-depressive depressed entering a new depressive cycle, an involutional depressive who had relapsed after electro-convulsive treatments in the past but who retained her remission on Tofranil, and a neurotic depressive who had not responded to psychotherapy). One patient who has shown a moderate response to Catron, is suffering from a schizophrenic character disorder with chronic depression;

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she has experienced some relief of symptoms on Catron 6 mgs. a day.

In a private psychiatric practice dealing with a wide range of problems in a group of patients who might be considered to be more responsive to treatment than institutionalized patients, the results are disappointing and certainly not consistent with the claims made by the advertisers or in reports in the literature.

TOXIC AND OTHER SIDE EFFECTS OF NARDIL PHENELZINE SULPHATE W-1544A

UJAMLAL C. KOTHARI, M.D.[1]

Contrary to the experiences of previous workers, we have come across cases where liver function test became abnormal after the use of this drug and one patient developed a marked drug rash soon after the first dose of Nardil.[2]

Toxic effects on liver: This study consists of 13 patients, on whom C.B.C., C.C.F. (cholesterol cephaline floculation), B.U.N., and urinalysis were done and were found normal prior to putting them on 15 mg. of Nardil t.i.d. Seven of them developed C.C.F. 1+ to 4+ during the treatment. For simplicity and better understanding they are divided into 3 groups.

Group A consists of 2 patients who developed C.C.F. 2+ to 3+ after one week's treatment. In one when the medication was continued, C.C.F. became increasingly positive. When the drug was discontinued, C.C.F. returned to normal. When the drug was discontinued with the other patient, C.C.F. became normal immediately. Same patient was again put on smaller doses increasing gradually to 15 mg. t.i.d. without further sign of liver damage.

Group B consists of one patient who not only developed C.C.F. 3+ after one week's treatment but also developed C.C.F. 2+ to 3+ after few weeks' treatment as a cumulative toxic effect like group C. C.C.F. in this case returned to normal on reducing the drug.

Group C includes 4 patients who did not show any immediate hepatotoxic effect but did develop C.C.F. 1+ to 2+ after few weeks' treatment. In two of them, the next C.C.F. report was normal despite continuation of the drug; but one showed more positive C.C.F.

None of them developed any clinical sign or symptom of liver disorder.

Drug rash: Unlike the reports by previous workers, one of our patients developed a marked, red macular rash with mild itching all over the body, which did not respond to usual anti-histamine treatment but gradually disappeared on discontinuation of the drug. Same patient was placed on smaller doses which were gradually increased to 15 mg. t.i.d. without further reaction.

Other side effects: Two of our patients, having a history of fluctuating blood pressure, developed hypotensive reaction with fainting and dizziness. This effect, being mild, was prevented by reducing the medication.

Insomnia and restlessness were the complaints of 3 patients and were treated with mild sedative and Meprobamate respectively.

Nausea, vomiting and headache *etc.* were not noticed in our patients.

Summary

This article being mainly about the side effects of phenelzine sulphate, its value as an anti-depressant agent is not discussed.

Risk of hepatotoxic effects of this drug is worth keeping in mind as 7 out of 13 cases showed some abnormality of liver function test. Phenelzine sulphate may produce drug rash as many other drugs do. Patients, having low or fluctuating blood pressure may develop hypotensive reaction while on this drug and should be under close supervision. Sometimes it produces side effects like insomnia and restlessness

[1] Danville State Hospital, Danville, Pa.

[2] Warner-Chilcott Laboratories. Phenelzine Nardil (W-1544A). For investigation use only.

which can be relieved by sedative and Meprobamate.

No toxic effects on kidneys or blood were observed in our study.

All the above effects are mild and reversible and may be treated by reducing or discontinuing the medication and with adjuvant therapy.

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CLINICAL FINDINGS AND PSYCHOPHYSIOLOGICAL TESTS OF THE EFFECTS OF A NEW PSYCHOPHARMACOLOGIC AGENT : DORNWAL [1]

CARNEY LANDIS, PH.D.,[2] JOHN R. WHITTIER, M.D.,[3]
DONALD DILLON, PH.D.,[2] AND RUTH LINK, M.A.[2]

In earlier investigations(1, 2, 3, 4), changes in psychophysiological performances were found which could be attributed to "active" psychiatric treatment methods such as psychosurgery, electroconvulsive therapy, insulin coma therapy, and certain of the ataractic drugs. The changes were shown by the tests of flicker-fusion thresholds, speed of choice reaction, speed of tapping, the Purdue Pegboard dexterity, and both Test Age and Qualitative scores on the Porteus Maze. Patients treated only with psychotherapy gave no systematic test score changes or losses.

A new drug, Dornwal (aminophenylpyridone), which seemed to influence behavior without the disadvantages of sedation, was made available to us through the courtesy of Dr. John V. Scudi who suggested that we test its therapeutic properties with a probe group of hospitalized psychiatric patients.

Eleven recently admitted patients (6 schizophrenics, 3 chronic alcoholics, 2 anxiety hysterics) at the Creedmoor State Hospital were treated with either 200 mg., t.i.d. or 400 mg., t.i.d. Dornwal, each over a 2-week period. At the end of the period, the ward physicians and examining psychologists rated the patients as to outcome as follows : 5 were much improved or recovered ; 4 were improved, and 2 were unimproved.

The typical comment on the part of the patients after having ingested Dornwal was, "I feel calmer and more relaxed." Ten of the 11 patients made remarks to this effect, and their statements and behavior agreed for 9 of these 10 patients. Of the 2 unimproved patients, one said he felt no better nor did he behave in a calmer fashion, and one said he felt calmer but did not behave accordingly.

Two of the 11 were at first negativistic, but following treatment, negativism was reduced. Manifest hallucinatory and delusional activity was stopped in 2 patients during Dornwal treatment. The behavior and complaints of 4 others indicated reduced anxiety and tension at the end of the drug therapy and for at least one week thereafter. In one patient very evident finger tremors ceased. There was less evident depression with 4 patients. One patient stated that, "the pills slow me down." Only one patient showed any noticeable tendency to be drowsy or sleepy.

A relationship between dosage and clinical outcome was manifested. Of the 5 patients receiving Dornwal, 200 mg., t.i.d., only one was rated as much improved. Four of the 6 patients, who received 400 mg., t.i.d., were rated as much improved.

Dornwal did not depress any of the performances in our battery of psychophysiological tests. Very probably it had a slight facilitating effect upon most of the test

[1] This investigation was facilitated by NIH grant M-872 and by assistance received from the Wallace and Tiernan Co. The latter furnished the drugs and placebos utilized. The investigation was done at the Creedmoor State Hospital. We are most grateful to Harry A. LaBurt, M.D., Senior Director, and his staff for their cooperation and assistance.

[2] New York State Psychiatric Institute, 722 West 168th Street, New York City 32.

[3] Creedmoor Institute for Psychobiologic Studies, Queens Village 27, New York.

measures but this facilitation was somewhat confounded by practice effects.

In terms of grouped data, no statistically significant differences between any test performances before, during, or after drug treatment were found. However, the analysis of the data for individual patients showed that Dornwal did not act to interfere with the scores on the test performances in flicker-fusion, choice reaction time, Tapping, Purdue RLB dexterity or Porteus Maze tests. In fact, particularly at the 400 mg., t.i.d. dose level, Dornwal acted as a mild stimulant.

During the two weeks that Dornwal was given, urinalysis and CBC determinations were secured at regular intervals from each patient. At no time did these measures exceed the normal range of variation.

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THE EFFECT OF DEANOL ON THE ACTIVITY OF CHRONIC SCHIZOPHRENIC PATIENTS

STANLEY L. PORTNOW, M.D., MARK B. ARDIS, M.D., AND JOHN E. LUBACH, PH.D.[1]

This study was undertaken to evaluate the effect of the addition of the energizer, deanol [2], to the chemotherapeutic regime of chronic schizophrenic patients. It is assumed that deanol acts as a central nervous system energizer by crossing the blood-brain barrier and being converted intracellularly into acetylcholine(1, 2). This energizing effect might be expected to be beneficial to patients who, although engaged in active chemotherapeutic and milieu treatment programs, have stabilized at relatively low levels of adjustment characterized by apathy, disinterest, and apparent lack of energy. For this investigation, it was hypothesized that any increase in alertness, readiness to relate to others, or interest in environment resulting from the addition of deanol to their chemotherapeutic program should manifest itself in an improvement in their functioning in an activity such as occupational therapy (OT).

For this 3-month double blind study, subjects were 20 male chronic schizophrenic patients ranging in age from 21 to 64, who had been hospitalized continuously for at least one year. They attended OT in two sections of 10 patients each, the assignment determined by a random selection procedure. These sections were then each divided into experimental and control groups of 5 subjects equated on the basis of evaluations at the end of a 2 week observation period. The 10 patients in the experimental groups were started on deanol in doses of 200 mg. daily for 6 weeks. The 10 control subjects received placebo. At the end of 6 weeks the dosage was raised or lowered by the ward physician according to clinical indications, some patients receiving as much as 300 mg. daily. Current medications including tranquilizers were continued and adjusted as indicated. However, no patient received another energizer or central nervous system stimulant.

During the entire investigation, bi-weekly evaluations of performance were made by the two occupational therapists who worked with both sections of patients. Evaluations were made by means of the MACC Behavioral Adjustment Scale(3) and direct ratings of sociability, activity involvement, and appropriateness of behavior. Ratings on the same scales were made by the two ward physicians to evaluate ward behavior

[1] VA Hospital, Topeka, Kansas.

[2] Deanol (2-dimethylaminoethanol) was supplied as Deaner®, the para-acetamidobenzoic acid salt of deanol, by Riker Laboratories, Inc., Northridge, California.

The authors wish to acknowledge the kind assistance of John W. Chotlos, Ph.D., Charles G. Hermann, M.D., Alversa B. Milan, O.T.R., Raymond E. Reinert, M.D., and Ora I. Rhudy of the VA Hospital, Topeka, Kansas.

at the beginning and at the end of the 3 months.

Discussion and Summary

For both the OT and ward evaluations, the scores used were the combination of the ratings by the pairs of raters. In the OT setting both drug and placebo groups showed a consistent trend toward improvement as might be expected from adaptation to the experimental situation. This trend was statistically significant on 3 of the 4 measures used. However, the major hypothesis was not supported in that there were no discernible differences between drug and control groups in amount of change. This suggests that the addition of deanol had no appreciable effect in making the subjects more ready to respond in this treatment situation.

The ratings of ward behavior revealed no recognizable changes for either the experimental or control groups. As a further indication that deanol was ineffective in producing the type of improvement anticipated, the occupational therapists, ward physicians, and other ward personnel involved were unable to guess better than chance at the end of the experiment which patients had been receiving the drug and which placebo.

Laboratory investigation during the test period included weekly determinations of SGP-transaminase, urine ictotest, hemoglobin, white blood count and differential and gamma globulin turbidity, with a monthly serum alkaline phosphatase determination. The only side effect of the drug noted was a transient leucocytosis in one patient.

These results are regarded as casting doubts on the therapeutic value of deanol for chronic schizophrenic patients.

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CLINICAL USES OF SCTZ—A PRELIMINARY REPORT [1]

Lt. Col. KIRPAL SINGH, M.B., B.S. ; D.P.M. [2]

SCTZ, which is a chlor-derivative of the thiazole portion of the thiamine (vit. B1) molecule (a 5 B chloroethyo-4- methyl-thiazole salt) has been favourably reported upon by some French workers (Laborit *et al.* 1957), in the treatment of psychiatric conditions characterised by agitation, restlessness and over-activity. Intravenous administration was found to produce sleep closely resembling normal sleep which was believed to be due to an inhibition of the cerebral cortex with no action on the reticular formation or the autonomic nervous system ; its mode of action thus differing from some other tranquilizing agents. No serious toxic symptoms were encountered in the clinical trials in France.

The drug has been used in a small series of 11 cases during the last 6 months at Poona. Five were suffering from psychotic (hypomanic 2, schizophrenic 3) and 6 from psychoneurotic reactions. All the psychotic and most of the psychoneurotic cases were agitated and restless. In 3 psychoneurotic cases the drug was used for narcoanalysis in the place of the usual barbiturate preparations like amylobarbitone (amytal sodium) or thiopentone (pentothal).

METHOD

The drug was administered intravenously (100 to 160 c.c.) in 3 to 6 minutes in all but 2 psychoneurotic cases who received the oral tablets only. In those who received intravenous injections the continuation treatment was in the form of tablets. In two female psychotic patients who were most uncooperative, it was decided to give ECT

[1] A detailed report is being published in the Indian Journal of Psychiatry, Oct. 1959.

[2] Senior Specialist in Psychiatry, Military Hospital, Poona, India.

and follow it by SCTZ intravenously.

In the beginning a 100 c.c. syringe was used for administering the drug but as it was too difficult to handle, it was soon replaced by a 20 c.c. syringe with a two way connection.

RESULTS

The intravenous injections of the drug were followed rapidly by sleep which was, however, of very short duration (a few minutes to half an hour) in most cases, thus necessitating repeated injections. There was a symptomatic relief in 6 out of 8 cases of agitation, restlessness and overactivity and one case of hypomania became completely asymptomatic within 10 days and continues so 6 months after the treatment. The drug had no effect in one case of schizophrenic (catatonic) excitement and another case of anxiety neurosis.

A chronic psychoneurotic who had used several other preparations previously gave a favourable report in respect of SCTZ tablets and said that the sleep promoting effect was very rapid and appeared within 5 to 7 minutes.

A combination of ECT and SCTZ used in two cases of this series did not produce any undesirable effect, nor did a simultaneous use of this drug and chlorpromazine lead to any untoward effect.

SCTZ was found to be adequate for the purpose of narcoanalysis and promoted the establishment of rapport in all 3 cases where it was used for this purpose; 60 c.c. of the solution intravenously was found sufficient in these cases. The patient was able to answer questions but a release of emotions reported by some French workers using the drug, and which also frequently occurs with preparations like sodium amytal and pentothal, did not take place in any of the cases nor was there any euphoria and tendency to overtalkativeness, which not uncommonly follows, and results in a disturbed sleep, when a combination of a barbiturate with a cerebral stimulant like methedrine, is used for narcoanalysis. The use of SCTZ for narcoanalysis has not been mentioned in previous literature.

Phlebitis occurred in 5 cases, probably due to the low pH of the solution.

Conclusion

Owing to the small number of cases treated so far, no firm conclusions can be drawn. The drug when administered intravenously produces sleep very rapidly which lasts for a few minutes only, thus necessitating frequent injections or recourse to an intravenous drip. The quantity required at one time varies from 100 to 160 c.c. In uncooperative cases when it is difficult to administer the drug, it can be injected after giving an ECT. Phlebitis appears to be a common complication and was met with in 5 cases. Further controlled trials are indicated.

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ACKNOWLEDGEMENTS

Thanks are due to Messrs. Franco Indian United Laboratories, Bombay, for supplying the drug and to the Director of Medical Services, Army, for permission to publish this paper.

COMMENT

A CHILD DIES

She was only six years old. Still she had a right to live. It was an emergency case—the all too common tragedy of the streets. This time it was a depressed compound fracture of the skull of a little child. Her condition was critical. She might not live anyway. But then again she might, if she could have everything that medical science could offer—immediate operation, and then, as indicated routine, a blood transfusion. The surgeons were there, trying to do their duty—to save a life.

But the child, being a minor, could not authorize the blood transfusion. Were there not older and presumably wiser persons who could speak for her, and satisfy that formality? Her parents were there, but they exercised their ownership rights and withheld consent to the transfusion. The child died.

Why did the parents refuse a measure that might have saved her life? They were Jehovah's Witnesses and their authority was some lines in Leviticus and Deuteronomy forbidding the children of Israel to "eat blood."

This all happened in New Jersey and is reported in the *AMA News*, Dec. 14, 1959.

Hospital officials plead in vain with the parents to permit the transfusion. By legal process they were brought before a judge whose efforts were likewise fruitless. There is an amendment to a New Jersey Statute which upholds the right of a parent to take the stand these parents took if it is based on a "religious belief."

This raises the question, as to the nature and quality of the religious belief involved. Is it evidence of a sound and disposing mind? Does it indicate proper parental care for the welfare of the child, even for the life of the child? In a word, are these parents suitable persons to have custody of the child? It is common knowledge that children are routinely removed from the custody of their parents on evidence that they are not receiving the proper care and protection.

In the present case this little girl could have been made a ward of the court and given the necessary treatment regardless of the parents' veto; that is, if under New Jersey law such procedure is recognized. In any case there was not time; the child was dead before the required legal steps could be taken.

The representative of the *AMA News* asked the attorney for the hospital what could be done to prevent recurrence of a similar situation. The lawyer replied: "I guess we need an amendment to the amendment."

The object lesson of this case in New Jersey should be taken note of throughout the land.

CORRESPONDENCE

Editor, THE AMERICAN JOURNAL OF PSYCHIATRY :

SIR : With reference to the clinical note entitled "A Modification of the Forrest Test for Phenothiazines" by Mr. Jack J. Heyman, Drs. M. Almudevar and Sidney Merlis in the September 1959 issue of *The American Journal of Psychiatry,* we studied the applicability of 2% $FeCl_3$ stained filter paper of different grades and textures. We found that Whatman 3MM filter paper gave discrete and stable colored spots with this modified procedure. It compared favorably in sensitivity and stability of developed phenothiazine color with a sulfonic acid cation exchange paper (Amberlite XE-69 supplied through the courtesy of Rohm & Hass Company). Furthermore, the originally pure white Whatman 3MM paper provides a more brilliant yellow background (after impregnation with 2% $FeCl_3$ solution) and better contrast for the violet or purple color produced from phenothiazine metabolites than the off-white sulfonic acid resin paper. We feel that the advantage in simplicity of this modification can be further increased by the use of Whatman 3MM filter paper.

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Luther W. Reynolds, B.S.,
Research and Development Div.,
Smith Kline & French Laboratories,
Philadelphia, Pa.

REPLY TO THE FOREGOING

Editor, THE AMERICAN JOURNAL OF PSYCHIATRY :

SIR : Thank you for your courtesy in sending me the enclosed letter from Dr. T. H. Lin.

As a matter of fact, we had tried lighter grades of filter paper with very poor results. Dr. Lin's observation on the heavy weight Whatman 3MM paper has been confirmed by us. This paper is certainly superior to the SA-2 ion exchange resin impregnated paper and comparable to the SA-1 paper which is much lighter in color that the SA-2.

We have been working with another modification, using Dr. Forrest's mercuric nitrate reagent. We feel that this is even superior to the $FeCl_3$ impregnated paper because we can now detect the low-dose drugs such as Stelazine, Trilafon, *etc.*

Jack J. Heyman.

NEWS AND NOTES

Symposium on LSD-25 Scheduled.—The first invitational conference of Napa State Hospital, Imola, California, a symposium on Lysergic Acid Diethylamide (LSD-25), will be held on Saturday, January 16, 1960, sponsored jointly by the hospital and Sandoz Pharmaceuticals. Basic science aspects of this hallucinogenic drug will be discussed during the morning; the clinical and therapeutic status during the afternoon.

Sidney Cohen, M.D., Chairman, Research Committee, Veterans Administration Center, Neuropsychiatric Hospital, Los Angeles, will be the guest lecturer. Other participants will include faculty members from Stanford and the University of California medical school, Langley Porter Neuropsychiatric Institute, and practicing psychiatrists and psychologists.

Neurology Residency Bronx V. A. Hospital.—The Bronx Veterans Administration Hospital in affiliation with Columbia University announces an approved 3 year residency program in neurology. In addition to work at the V. A. Hospital, residents spend 6 months full time at Montefiore Hospital, 4 months full time in the department of neuropathology at the Columbia-Presbyterian Medical Center, and over a period of 14 months attend various neurologic outpatient clinics of the New York Neurological Institute. Lectures in the basic sciences are given at Columbia University. The training program is under the immediate supervision of Dr. Carl B. Booth in collaboration with Dr. Daniel Sciarra, Dr. Abner Wolf, and Dr. Tiffany Lawyer, Jr.

Any interested candidates may obtain information about this program by writing directly to Carl B. Booth, M.D., Chief, Neurological Section, V. A. Hospital, 130 West Kingsbridge Road, Bronx 68, N. Y.

Massachusetts Mental Health Center Training Program.—To help fill the need for research scientists in the mental health field, the National Institute of Mental Health has awarded a grant of $400,000 to Harvard Medical School and Massachusetts Mental Health Center for the training of selected psychiatric residents after their third year of training or Ph.D.s interested in mental health research careers. The candidate may be attached to one of 8 laboratories, including clinical psychiatry, social science, psychology, psychophysiology, psychopharmacology, neurochemistry and neurophysiology, for his major "arbeit." In addition there will be interdisciplinary seminars involving the designated laboratories from the Harvard Quadrangle and from the Massachusetts Mental Health Center Research Department. Special formal and informal instruction also will be arranged to suit the candidates' needs.

The program is under the direction of Dr. Milton Greenblatt (Assistant Superintendent and Director of Research at the Center), and Dr. Jack R. Ewalt (Superintendent and Professor of Psychiatry).

Latin American Society of EEG and Clinical Neurophysiology.—Because of the expanding interests in the branch of electroencephalography and clinical neurology, the South American EEG Society has incorporated as one of its members the Mexican Society of EEG. This incorporation has brought a change in the name of the EEG Society which henceforth will be known as the Latin American Society of EEG and Clinical Neurophysiology.

Its Officers are: Dr. Carlos Villavicencio, of Santiago, Chile, President; Dr. Paulo Vaz de Arruda, of Sao Paulo, Brazil, President-elect.

Dr. Abraham Mosovich, of Buenos Aires, Argentina has been elected Honorary Secretary of the newly expanded society.

Dr. Brody Heads Psychiatry, University of Maryland School of Medicine.—Dr. Eugene B. Brody has been appointed Chairman of the Department of Psychiatry and Director of The Psychiatric Institute of the University of Maryland School of Medicine. He succeeds the late Dr. Jacob E.

Finesinger. Dr. Brody came to Maryland from Yale in 1957 as professor of psychiatry and has been Psychiatrist-in-Chief of the University of Maryland Hospital and The Psychiatric Institute since 1958.

American Psychopathological Association, Inc.—The Association will hold a symposium on the "Psychopathology of Aging" at its 50th annual meeting at the Park Sheraton Hotel, New York City on Friday and Saturday, February 19 and 20, 1960. This symposium will be published in the course of the year.

Guideposts To Mental Health.—A revised edition of *Guideposts to Mental Health* is now available from the New York State Department of Mental Hygiene. Most popular of the department's many publications, the seven-pamphlet series has required 8 printings to distribute more than 2½ million copies since its debut in 1949. The text was written by Margaret M. Farrar, director of mental health education and information.

Single copies or complete sets of the series, titled Life Begins, School Days, Teen Time, Your Marriage, Your Job, The Middle Years, and The Golden Age, may be obtained by anyone without charge from the Office of Mental Health Education and Information, Department of Mental Hygiene, 240 State Street, Albany, N. Y.

American Psychosomatic Society.—The 17th annual meeting of the society will be held at the Sheraton-Mt. Royal Hotel, Montreal, Saturday and Sunday, March 26 and 27, 1960.

At the Sunday morning session there will be a panel discussion on contributions of behavioral scientists to psychosomatic medicine by speakers representing anthropology, medicine, psychiatry and sociology.

Registration fee for non-members is $5.00, students, interns, residents and fellows $1.00.

London Conference on the Scientific Study of Mental Deficiency.—The London conference on the scientific study of mental deficiency will be held July 24-29, 1960, at the British Medical Association's Headquarters, Tavistock Square, London, W.C.1.

A wide range of subjects will be covered providing information on the latest scientific developments in the field of mental deficiency with opportunities for discussion. Invitations to give papers have already been provisionally accepted by outstanding workers from Great Britain, Belgium, Denmark, France, Germany, Holland, Sweden and the United States.

Membership of the conference is open to professional workers in all branches of the mental deficiency field; medical, psychological, educational, social and administrative.

Further information may be obtained from the president of the International Conference Committee of the American Association on Mental Deficiency, Mr. Harvey A. Stevens, 301 Troy Drive, Madison 4, Wisc., or from Arthur W. Pense, M.D., New York State Department of Mental Hygiene, 240 State Street, Albany, N. Y.

Twelfth Annual Institute in Psychiatry and Neurology, North Little Rock, Ark.—This annual institute will be held February 25 and 26, 1960, at the North Little Rock Division of the Consolidated Veterans Administration Hospital.

In addition to psychiatric sessions, there will be conferences in clinical psychology, psychiatric social work, psychiatric nursing and dietetics. There will be various social activities including a dinner the evening of February 25 when Dr. Mathew Ross will be guest speaker.

The Hofheimer Prize.—This prize of $1,500 is awarded annually by The American Psychiatric Association for an outstanding research contribution in the field of psychiatry or mental hygiene which has been published during the previous 3-year period. Studies in press or in preparation are not eligible.

This competition is open to citizens of the United States and Canada, not over 40

years of age at the time the study was submitted for publication; or to a research group whose median age does not exceed 40 years. The next award will be made at the annual meeting of the Association in May 1960. Entries submitted to the Prize Board before March 1, 1960, will be considered. It is imperative that 8 reprints or duplicated copies of each entry as well as the necessary data concerning age and citizenship be sent to David A. Hamburg, M.D., Chairman, Hofheimer Prize Board, National Institute of Mental Health, Bethesda 14, Maryland. All entries are independently evaluated by each member of the Hofheimer Prize Committee and final selection determined by equal vote.

Tape Recordings, The Woods Schools, Langhorne, Pa.—The president of the Woods Schools announces 2 new recordings from the conference on "Counseling Parents of Children with Mental Handicaps" held in cooperation with the University of Minnesota :

1. "Counseling with Parents at Time of First Knowledge of Retardation," by Reynold A. Jensen, M.D., Professor of Psychiatry and Pediatrics, University of Minnesota.
2. "Helping Parents in a Community Setting," by Harriet E. Blodgett, Ph.D., Assistant Professor, Institute of Child Welfare, University of Minnesota.

These records (12-inch, double-sided, high fidelity discs) can be borrowed for group meetings without cost except for shipping charges both ways. Three weeks' advance notice necessary.

Survey of Psychiatric Facilities in Colorado.—At the invitation of Governor McNichols of Colorado, Governor Rockefeller of New York has authorized a survey of psychiatric facilities in the former state by Commissioner Paul H. Hoch of the New York service. Dr. Hoch will go to Denver late in January where he will aid in setting up a long-range mental health program.

In giving his approval, Governor Rockefeller said, "The administration is happy to cooperate in strengthening mental health programs in the states and to make Dr. Hoch's services available to that end."

Correction.—In the December 1959 Journal, line 8 of footnote 3, page 549 should read . . . 10 to 150 mg. . . . instead of . . . 10 to 15 mg. A further correction made by the author is that the last paragraph on p. 549 should start : "Trifluoperazine (Stelazine) . . ." instead of "Triflupromazine . . ."

Birthday Portrait for Clarence B. Farrar.—On his eighty-fifth birthday, November 27, 1959, at a dinner in his honour at the Albany Club, Toronto, Dr. Farrar was presented with his portrait, painted by the well-known artist, Archibald Barnes, R.C.A.

Former students and colleagues had gathered from many points in Canada and the United States to pay tribute to a great teacher. Professor D. Ewen Cameron of Montreal made special mention of the guest of honour's important contribution as Editor-in-Chief of the Journal of the American Psychiatric Association since 1931.

Dr. C. M. Hincks spoke about the "early days," drawing attention to the fact that Dr. Farrar was the first full-time professor of psychiatry in Canada on his appointment in 1925. Dr. D. G. McKerracher of Saskatoon dealt with the postgraduate era, depicting "a conference" with great clarity and humour.

After presentation of the portrait, Dr. Farrar replied by thanking the contributors and then went on to pay tribute to his predecessor, Dr. C. K. Clarke as well as others who had been associated with him until his retirement in 1947.

Congratulatory telegrams were received from individuals and organizations attesting the esteem in which he was held as Professor, Department of Psychiatry, University of Toronto : and, in a sincere and witty epilogue, Professor A. B. Stokes summarized the sentiments held by all who have been fortunate enough to be associated with Dr. Farrar in his long career of such great significance to the advancement of Psychiatry.

BOOK REVIEWS

Objective Approaches to Treatment in Psychiatry. By *Leo Alexander, M.D.* (Springfield: Charles C Thomas, 1958, pp. 139. $4.50.)

Anyone venturing to write a textbook on treatment in psychiatry during 1958 was a brave person. So much was happening in so many fields; approaches came from diverse areas; results of various treatments remained open to question; yet great progress was being made during this year.

The writer of this review can vouch for the fact that Dr. Alexander is a brave pioneer in the many facets of psychiatric treatment. Also, he is about as objective and scientific, yet pragmatic as any contributor in the field of psychiatric therapy.

To condense the *Treatment in Psychiatry* to a little over 100 small pages must have been a prodigious undertaking. And Dr. Alexander must have known full well that many aspects of his "arbeit" would change from the time he submitted the manuscript until the book came out and reviews were published.

That Dr. Alexander is eclectic in approach is not to be denied. He is well qualified in psychoanalytic therapy. He has had extensive first-hand experience in the various types of shock treatment as well as the numerous drug therapies. His range of experience extends from state mental hospitals through army service to private practice, both abroad and in this country.

As the title indicates, the author starts with a plea for objectivity in acceptance of treatment methods, recognizing that almost all psychiatric therapy is empirical and symptomatic. Sharpening of diagnostic and prognostic evaluations is called for as a firmer basis for therapeutic decision. Considerable emphasis is placed on the Funkenstein test and other autonomic test responses in relation to treatment.

Throughout the book there are numerous interesting, discerning and challenging discussions that help to bridge the gap between "organic" and "functional" viewpoints. The "organic" is in the field of neurophysiology and not in pathology or anatomy except for consideration of the autonomic system. The Pavlovian theories pertaining to excitation and inhibition (and as refined and elaborated by Gantt and others) are brought into the interpretation of anxiety, depression, hallucinosis, delusion formation, *etc.* The effect of these emotional and physiological factors on the ego, and reaction of the ego to them become an important part of the total picture that is the guide for treatment. A review cannot do justice to the clearly stated and documented theories put forth by Dr. Alexander.

In this volume there are some rather definite statements about the "treatment of choice," such as the value of insulin shock therapy in schizophrenia, the excellent results of ECT in depressive conditions and the advantages of psychotherapy in neuroses. In "Drug Therapy," Chapter V, the author gives a compressed (20 pages), yet fairly complete survey of this rapidly expanding field. "Frontal Lobotomy" is discussed in 5 pages and brought into an up-to-minute perspective as a therapy of last resort. Again, the author was brave in attempting to discuss psychotherapy in 19 pages, but nevertheless there is much food for thought in this chapter which reflects Dr. Alexander's personal eclectic approach and understanding.

The extensive list of references is well chosen and the volume has an excellent index. This small volume should not be judged by its size. It is recommended for reading by psychiatrists, neurologists and others in related fields, not so much as a guide for specific therapy in an individual case but for stimulation to further thought and research in therapy with due consideration of Dr. Alexander's hypotheses and his pragmatic yet objective approach.

Lloyd J. Thompson, M.D.,
Winston-Salem, N. C.

Grosse Nervenärzte. Vol. II. Edited by *Kurt Kolle.* (Stuttgart: Georg Thieme Verlag, pp. vii + 251, 14 ills., 1959. D.M. 29.40. $7.00.)

In 1956 Professor Kolle brought out a volume, titled as above, containing biographies of 21 great neurologists and psychiatrists of the modern era, the earliest included being Pinel. He called attention to the difficulty, in order to keep the book within bounds, of making selections from among the many great names of the 19th and 20th centuries; and held out the possibility that a second series might follow. Here it is. And now again the compilation involved the same problems as the first. Judging by the importance of this work one may hope that a third volume may be under consideration. In his preface the

Herausgeber even indicates that likelihood.[1]

The persons whose life stories are told here are: Golgi, Nissl, Alzheimer, Brodmann, the Vogts, Helmholz, Quincke, Esquirol, Th. Meynert, Wernicke, Adolf Meyer, Gaupp, Pierre Marie, Babinski, Henry Head, Economo, Horsley, Walter Dandy, Clovis Vincent, Dubois, Hermann Simon.

It is especially to be noted that Kolle selected his collaborators on the basis 1) of their established research record; 2) of their expert knowledge of their subject; 3) as far as possible, of their close personal contact with the persons they were to write about. Any one who has heard a speaker discuss a great man he, the listener, has intimately known, but the speaker has not, will appreciate the importance of the third qualification.

To mention a few of the contributors to the present volume: the editor writes about Geheimrat Heinrich Quincke who often accompanied his father, Geheimrat Kolle, and himself, then a medical student, on their evening walks. The debt of psychiatry and neurology to lumbar puncture, first practiced by Quincke and reported in 1891, can hardly be overestimated.

Henri Ey contributes the biography of Esquirol, friend and favorite pupil of the great Pinel. It was Esquirol who was mainly responsible for asylum reform in France and for the humane provisions of the Act of 1838 which still holds good today.

Sir Geoffrey Jefferson has written the chapter on Victor Horsley, scion of a family of musicians and painters. Horsley's pioneering hypophysis operation is dealt with, and Cushing's criticism and the differences between the two great neurosurgeons are touched upon.

Erwin Stransky writes about that singular scholar Constantin von Economo. Born in Rumania of a distinguished Greek family, he grew up in Trieste where language and culture were mainly Italian and chose Vienna as his ultimate home. He is famed as the discoverer of encephalitis lethargica (1917).

Oskar Diethelm is the author of the biography of Adolf Meyer; whose formulation of the concept of psychobiology wherein a multiplicity of factors, genetic, psychological and social, determining habit formation and personality type and likewise predisposition to mental health or illness, has been widely influential in both American and British psychiatry. His teaching has been aptly summed up as a "common sense psychiatry."

[1] See also Kolle: Kraepelin und Freud. Beitrag zur neueren Geschichte der Psychiatrie (Stuttgart: Georg Thieme Verlag, 1957, pp. 88. $1.80.)

In writing about Franz Nissl, Hugo Spatz points to the remarkable fact that Nissl, the 24-year-old medical student at the University of Munich, wrote a prize essay on the pathological changes in the nerve cells of the cerebral cortex, wherein he was first to describe the particles embedded in the cytoplasm which have ever since borne his name, differentiated fixing and staining methods for different structures, as cells and fibres, described 7 forms of pathological nerve cell changes, likewise the laminar structure of the cortex—in short in that astonishing student essay laid the foundation of the histopathology of the cerebral cortex, indicating the changes characteristic of general paresis and showing the possibility of differentiating other psychoses associated with organic brain changes.

It would be a pleasure to give more than these fragments of the stories mentioned above, and to include reference to the other biographies as well, but there isn't room. Professor Kolle addresses this volume, like its predecessor, particularly to the younger psychiatrists and neurologists that they may become acquainted with the achievements of their great predecessors, upon whose shoulders, mayhap, some of them may one day stand to push outward still further the boundaries of knowledge.

C.B.F.

Basic Issues in Psychiatry. By *Paul V. Lemkau, M.D.* (Springfield: Charles C Thomas, 1959, pp. 106. $3.50.)

This is a book, addressed primarily to general practitioners, which opens a perspective that many busy psychiatrists have lost sight of in their preoccupation with problems immediately at hand. It comprises a series of lectures, given in a post-graduate program, sponsored by the American Academy of General Practice. They were correlated with a series of lectures on internal medicine and pediatrics. The author makes some tantalizing references to the contribution of his colleagues in his discussion of his own concepts of basic psychiatric issues.

The author, trained as a psychiatrist, is Professor of Public Health Administration at Johns Hopkins University, and is in a unique position to furnish the reader with refreshing and provoking glimpses of what psychiatry is doing and where it may be going. Dr. Lemkau's method of doing this is disarming. His style may seem a little bewildering and too innocent to the beginner, but around any corner, one may come upon a few simple statistics, garnered from unexpected places,

which are startling and thought provoking. A typical example concerns the findings of a psychiatrist who was general practitioner, for 4 years during the war, to a village of 2,500 in northern Norway. Other equally startling items suggest the possibility that psychiatrists will soon have to face a very real problem as to where the boundary lines of psychiatric practice should be drawn.

Basic Issues In Psychiatry makes no pretense of being exhaustive and is therefore easy to read. This reviewer would like to read it again, supplemented by a perusal of some of the biographical references to work already done and in process of completion. It would make him a wiser clinician and a more challenging teacher.

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PSYCHIATRIC ARCHITECTURE. Edited by *Charles E. Goshen M.D.* (Washington : the American Psychiatric Association, 1959, pp. 156. $10.00.)

This book presents selected materials produced by the Architectural Study Project established in 1953 under the joint auspices of the American Psychiatric Association and the American Institute of Architects. The aims of the Project were to develop effective communication between the professions of psychiatry and architecture, and to define the basic principles which determine good mental hospital design.

It is apparent from the first 5 papers and from other comments throughout the collection that a considerable number of the contributors conceived the goal as the development of architectural design that would have a positive therapeutic effect on the patient.

There is considerable comment on how the patient perceives space and the arrangement of space, how he is affected by colour, sound, odour, and texture, and how personal interaction is hindered or facilitated by the arrangement of space and furnishings. However, the comment is largely speculative. Many questions are asked but few are answered. The papers describing actual units are not closely related to these theoretical discussions but adhere to the more familiar and less speculative approach which seeks chiefly to provide unobtrusive surroundings which will not interfere with the therapeutic process, avoiding traditional institutional characteristics. Although it is only mentioned once or twice, the reader feels the implication that the concept "hospital" now conveys too much of illness, regimentation and limitation, and that it is being replaced by "home," "hotel," or "country-club."

One quality of design universally approved but not adequately discussed is "flexibility." The description of "transitional spaces" in the article on Chestnut Lodge is worthy of note.

Personally, I enjoyed the speculative and theoretical discussions as well as provocative concepts and phrases such as "facilities for inactivity." For the more practical there are helpful lists of requirements and general specifications, descriptions of layout and equipment, and "A Check List for Mental Hospital Planning." However, in no sense of the word can this book be considered to be a manual of hospital design.

To round it out there is a 23-page article on "Mental Health Programs and Facilities in Europe and Asia" illustrated by 45 colour prints, which perhaps only confuses a seeker for the "right" pattern by showing what variety exists.

Two glossaries on "Mental Hospital Terms for Architects" and "Building Terms for Mental Hospital Administrators" will be of interest to the uninformed.

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HANDBUCH DER NEUROSENLEHRE UND PSYCHOTHERAPIE. Edited by *Viktor E. Frankl, M.D., Victor E. Freiherr von Gebsattel, M.D.*, and *J. H. Schultz, M.D.* (Munich and Berlin : Urban & Schwarzenberg, 1958, Parts 1-7, DM 19,-$19.50, 14,- 15,- 21,- $18.50, and 20,-)

The *Handbuch*, to be published in 5 volumes, each about 750 pages, will first appear in parts (*Lieferungen*), unbound. Each part will comprise up to 160 pages, and the contributions will be monographs. The entire field of the neuroses and psychotherapy will be treated, from the individual points of view of the authors ; however, controversial questions will be treated by two authors differing in point of view. The editors of the *Handbuch* believe that there is such a thing as a common basis underlying different views, and that it is the common basis on which psychotherapy will be built in the future.

Part 1 is devoted to the "suggestive methods" giving a comprehensive survey of the varied views on this method. Bernard Stokvis, one of whose two contributions is annotated by no less than 370 references in the bibliography, reports on various suggestive and autosuggestive methods, including less known but

significant details such as *rationelle* or *primitive* auxiliary aids. In his other contribution, Stokvis considers experimental-psychological matters relating to hypnosis, which go beyond the author's own recently published textbook. Of particular importance seem to be the psychosomatic aspects and the possibility of a clinical hypnosis. Ernst Kretschmer presents his two-way "standard method" (a combination of analytic and suggestive methods), which conceivably could constitute the psychotherapy of the future, particularly in short-term psychotherapy. His son, Wolfgang, writes on *Protrepik*, which combines all those methods that free the patient from his neurotic *Fehlhaltung* (disturbance) through sensory and verbal stimulation. The characteristic of this method is the *Dressur* of the patient. For instance, electric currents are used in treatment, and certain successes have been reported in cases of hysteria. Betz speaks about *mediative* methods, particularly the *Bildstreifendenken*. Certain combinations of pictures are transmitted to the patient in a motion-picture form while he is "relaxed". The author thinks that this method is not used widely in Germany, and this reviewer wonders where it is used "widely." Erwin Stransky contributes his well-known *Subordinations-Autoritaets-Relationstherapie*: the therapist appeals to the will of the patient first. However, it cannot be assumed that today's crop of therapists like this type of therapy (or, for that matter, *Protrepik*), as it runs counter to the transference relationships between therapist and patient, which are most in demand today.

Part 2 contains an excellent contribution by Strumpfl on "Heredity and Neurosis." The controversial subject of the heredity of the neuroses is handled in a new way, including the experiences of those psychologists who experiment with animals. Unfortunately, the author did not take into consideration Rene Spitz's research on the origin of neuroses in infants. Wolfgang Kretschmer writes on "Neurosis and Constitution" much in the same way as his father, Ernst, has taught this subject for many years, but Wolfgang treats the subject more comprehensively and brings the possibilities of the *Konstitutionsforschung* up to date. Birkmayer tells of the "vegetative syndromes" and stresses the pathogenetic and individual factors. He differentiates between a "sympathetic hypertony and hypotony" and a "para-sympathetic hypertony and the vegetative ataxia," which, according to Birkmayer, interacts in the disturbance of coordination and the vegetative regulation. Of particular interest to this reviewer are the 3 contributions by Freiherr Victor von Gebsattel, on the phobic, the "anakastic" and the depressive *Fehlhaltung* (disturbance). The causes of these disturbances are examined philosophically, yet no attempt is made to engage in speculations.

Part 3 is designed to give the reader a survey of the history of psychotherapy, and presents the present trend as well as developmental tendencies of individual cultures. Eliasberg writes magnificently on the history of psychotherapy. He asks many questions, as about social and psychological causation or "What is Cure?," *etc.* His contribution is amended by J. H. Schultz, who tells the reader of the historical situation in Europe. Pflanz writes on "Psychotherapy in Central Europe," Reiter on "Denmark," Harding on "Sweden," Johnson on "Norway," Kammerer on "France," and Stengel on "Great Britain."

In Part 4 the trends in Italy are discussed by Cargnello and Cesa-Bianchi, in Spain by Sarro, in Eastern Europe by Voelgyesi, in Russia by Kleinsorge, in China by Otto, in the USA by Hofstaetter; non-analytical psychotherapy in Latin America by Binder, and Psychoanalysis in Latin America by Kemper. For the German reader, the article by Hofstaetter is of the greatest value, as not only is the literature discussed but also critically evaluated. Although the value of Parts 3 and 4 lies in their source material for the German reader, they would appear to have the same value for the English reader, as most of the material, apart from Hofstaetter's article, is nearly unknown in the U.S.A. Thus the reader can familiarize himself with the cultural, ideological, religious, and schismatic differences among the various countries.

Part 5 deals with organismic treatments, such as J. H. Schultz's *Autogenes Training*, which the author invented and which never got a foothold in this country. Instead of reading a voluminous book on this subject, the reader gets the idea in the sometimes hard-to-read form of an abstract. E. B. Strauss and W. F. Coningsby write on narcoanalysis, Lucy Heyer-Grote on breathing-therapy, and our own J. L. Moreno on "Psychodrama," a subject more familiar to Europeans, where it originated, than to us.

Part 6 is partly entitled "Group Psychotherapy" and partly "Psychotherapy in Psychotic Illnesses." The former contains 2 articles by A. Friedemann, in essence equating group psychotherapy with sociogram and psychodrama à la Moreno (with which many

American group psychotherapists will take issue), only to a small degree taking cognizance of non-psychodramatic methods in group psychotherapy, particularly the psychoanalytic method, today perhaps the most widely practised approach in group psychotherapy in the U.S.A. The author does not avoid personalities, but, so far as the sociogram and psychodrama only are concerned, presents these methods founded by J. L. Moreno in an easily readable style.

The balance of Part 6 is devoted to the Psychoses,—R. Kraemer, P. Matussek, Victor E. Frankl and J. H. Schultz sharing the honors. J. Segers contributes a special article on the "Possibilities (of psychotherapy) within the frame of *stationaer-psychiatrischer Behandlung*" in institutions.

Part 7 is devoted to *Fehlhaltungen* (disturbances) only, dealing with the perverse, schizoid, paranoid, and impulse types of mental illnesses. The contributors are P. Matussek, J. H. Schultz, W. Th. Winkler, and H. Giese.

All told, the present endeavor is probably one of the most ambitious ever undertaken in neurology and psychiatry. This work also attempts to be as comprehensive as possible, but falls short in the eyes of many American readers because of the wide diversity of approaches and points of view. Nevertheless, comprehensiveness (in my opinion) can seldom, if ever, be satisfactorily achieved. Looking at the first 7 parts, one can only be amazed at the richness, immensity of outlook, and newness of territory. Almost any American reader will be glad to know that there is such an encyclopedic reference that will answer almost any question known to date to the medical and psychological researcher, practitioner, and student.

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80 PUERTO RICAN FAMILIES IN NEW YORK CITY. By *Beatrice Bishop Berle, M.D.* (New York : Columbia University Press, 1958. $4.75.)

In a period when sociology and anthropology have become almost as heavily burdened by abstruse terms and cliché references as psychiatry, it is most refreshing to come upon a really unpretentious piece of scientific writing. Medical education, too, has been criticized because it tends to teach all about rare and complex diseases and neglects "the problems of every day life" ; this little book may help restore the balance.

A physician and a small group of helpers set up medical practice in a slum inhabited mainly by Puerto Ricans and settled down to give service and, by thus earning the opportunity, to make observations on how the patients and their families live, subsist, relate to each other and to the social institutions around them. While considerable attention is given to disease and its effects, the book contains much more : the advantages of emergency room treatment over outpatient clinic attendance, the balancing of values of a good set of teeth compared to loss of time at work, the usefulness of one religious denomination as compared to another, the issue of how to change from white to blue collar class without loss of dignity or face. These and many other problems were posed by the 80 families who came under observation. Sometimes the problems were solved satisfactorily, sometimes there was continued and dismal failure. The sympathy and sensitivity with which the observations were recorded indicates that the author was able to achieve a genuinely non-judgmental attitude that allowed her to get facts rather than defenses.

There are few generalizations suggested. This is a descriptive study, not an analytic or synthetic one. It was associated with an anthropological study on a larger scale and had careful controls and checks on the observations made, but in the writing of this book we see only a perceptive clinician, not an obsessive theorist or one who needs to formalize her wisdom too much. It is a refreshing and humanistic study, real, down-to-earth. Anthropology and sociology need more like it and medical education needs them, too.

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LA FORMACION ESPIRITUEL DEL INDIVIDUO. 4th Ed. By *Honorio Delgado.* (Barcelona : Editorial Cientifico-Medico, 1958, pp. 197.)

The author surveys briefly the various schools of psychological thought : the experimental, reflectological, behavioristic, psychoanalytical, individual, gestalt, genetic and biogenetic. He then describes the physical, mental and emotional developments during infancy, childhood, preadolescence and adolescence. Of particular interest is the "Scheme of physical development of the individual" in table form. This is followed by the study of the mind in the process of formation.

The author treats the problem of personality from the viewpoint of a religious moralist with little attention paid to the dynamics of behavior as understood presently in modern texts.

"Culture is human life guided by spiritual value." He also ascribes determining influences to "blood and race," a theory that recalls the much discredited racism. "Faith and tradition" are extensively used throughout the book, but specific psychological and theological definitions of these terms are not given.

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THE BORDERLAND OF EMBRYOLOGY AND PATHOLOGY. By *R. A. Willis.* (London : Butterworth & Co., 1958, pp. 660. $18.00.)

The most fascinating book I ever read in anatomy was Sir Arthur Keith's *Human Embryology and Morphology.* It is the only book of its kind I know which reads like an exciting detective story. When, then, I read Dr. Willis' statement that Keith's book had long excited his interest and admiration, and that it was this work that brought him to England to study under Keith, I was prepared to find a book as informative and readable as Keith's—and I was not disappointed. This is an altogether thoroughly admirable book in every way. A pathologist with a natural desire to know the reason why, Dr. Willis here brings together the estimable results of his researches, reading, and reflection to give us what is probably the best account in any language of the conditions during development productive of pathology in man. Every aspect of the subject is covered, and almost all the many original illustrations are from the author's own preparations. There are excellent chapter bibliographies, and a good index.

The attractiveness of the book is such that it should gather a wide variety of readers within the charmed circle of its pages, for it deals with no less than the matter of human devolopment, and what may go wrong with it morphologically. And anyone interested in man, ought to be interested in that. Dr. Willis can be recommended as the perfect guide to morbid developmental embryogenetics.

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EXPLORATIONS IN SOCIAL PSYCHIATRY. Edited by *Alexander H. Leighton, John A. Clausen, Robert N. Wilson.* (New York : Basic Books, 1958. $6.75.)

SOCIAL PSYCHIATRY IN ACTION. A Therapeutic Community. By *Harry A. Wilmer.* (Springfield, Ill. : Charles C Thomas, 1958. $8.75.)

Neither the term "social psychiatry" nor its concept appears to be native to this country ; while social psychiatry is not a new method, it is an innovation here. There are several reasons for this reluctance of American psychotherapists (as contrasted with European, particularly English, colleagues) to adopt this method in this country. For one thing, "social psychiatry," especially as applied to a therapeutic community, denotes the treatment of a relatively few patients within a specially created setting, no matter how closely related to the "real" community, calls for an expensive outlay on buildings and personnel. Social psychiatry in therapeutic communities, therefore, is nearly non-existent in this country, and the few experiments made with this method, such as undertaken by S. R. Slavson, Fritz Redl, and Bruno Bettelheim, made "headlines" in professional circles because of their uniqueness.

The present volumes published simultaneously may indicate a changing attitude toward the treatment of the mentally ill, transferring it from the doctor's office or the hospital's ward to the community. The first book, *Explorations in Social Psychiatry,* has 18 contributors. The collection is uneven, since some of the contributors write about such topics as "Adolescent Drug Use" without really integrating the subject with social psychiatry. In addition, the editors, in a brief footnote, observe that social psychiatry has "somewhat" different meanings in America and abroad. Their own definitions are, in this reviewer's opinion, incorrect, inasmuch as the term "social psychiatry" is an imported, and not an indigenous, term, which most certainly cannot be applied to industrial and forensic psychiatry, as the editors think it can ; on the other hand, group therapy, which the editors feel is practised here but not abroad, cannot be isolated from the imported concept of social psychiatry since the latter was derived from group therapeutic concepts, and is *the* underlying method common here and abroad.

However, the value of *Explorations* appears to this reviewer to be immense. The contributors speak of a "community" (not *the* community), a township, which makes mental health programs possible whether through taxation or through voluntary efforts, such as chest drives. The "therapeutic community" is nowhere mentioned. Yet, the trend toward the tendency to consider the therapeutic needs of the individual beyond those needs which he has as a patient is evident everywhere. The editors have set themselves the task of examining 5 aspects: 1. The prevalence of mental illness, 2. The need for a concept of mental

illness, 3. The relation of mental illness to social pathology, 4. Socio-cultural changes, and 5. Personality development. It seems to this reviewer that, no matter how social psychiatry is defined, only aspects 3 and 4 are really related to social psychiatry, whereas the others are outside the *topic* of the book (not, of course, outside the province of psychiatry *per se*). Such chapters as "Health and the Social Environment" are the highlights of the book; and a statement like "some disturbances of mood, thought, and behavior occur as a part of man's adaptation to his social environment," while commonly accepted today, deserves to be explored more widely. Hence, the author's inquiry into the relationships among the 3 variables,—social environment, psychological disturbances, and bodily illnesses. The shortcomings of the book (inadequate conception of "social psychiatry," exclusion of previously published material here and abroad and hence omission of credit to the pioneers in this field, the dearth of case illustrations) are more than outweighed by the "explorations" and importations of Continental ideas (even though the editors might deny this) in a field hitherto very little known in America.

Social Psychiatry in Action, on the other hand, has, as its sub-title, "A Therapeutic Community," and thereby already indicates the aspects which it deals with. This book has adequate references (about 700 items) including most of the sources by the pioneers of social psychiatry, such as Bierer, Maxwell Jones, Ezriel, Bion in England; Slavson, Redl, and Bettelheim in this country, to mention a few. The author experimented with his therapeutic community at the psychiatric admission ward at the Naval Hospital in Oakland, California, and the book contains case histories only. He included but little theory and background for the concept of social psychiatry, leaving it to the reader to delve into the sources. It should be noted, however, that the term "community" is used by the author in a different sense than in England (where a community actually is created physically by the establishment of grounds, buildings, *etc.*) in that a ward of an existing hospital is "set aside" for the purpose of a community. However, as such, this ward community may be a "first," and therefore the "changing society on the ward," the roles of the various therapists (corpsmen, nurses, psychologists, and social workers) and community meetings (almost all based on group psychotherapeutic methods) are discussed in great detail and will enlighten many practitioners as to the employment of group meetings, spontaneous, face-to-face interaction, and the revelation of hidden "community" tensions, feelings and needs, to mention but a few. Therefore this volume will enrich our present literature, as, on the whole, will also the anthology of *Explorations*.

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NEKROPHILIE. STRUKTURANALYSE EINES FALLES. By *Th. Spoerri*. (Basel/New York: S. Karger, pp. 92. Bibliotheca Psychiatrica et Neurologica Fasc. 1o5, SF 15.)

Karl Birnbaum introduced the concept of structural analysis into psychiatry in 1923. Since that time this concept has been used with a variety of meanings. Spoerri defines structural analysis as the analysing consideration of a case in respect to the real relations within the totality of this case and the elaboration of the particularity of these relations.

The case is a necrophiliac with the diagnosis: dysplastic, schizoid, autistic-eccentric, unintelligent psychopath of depressive temperament with additional depressions. The man, now 33 years old, committed between 1946 and 1953 5 necrophilic acts. He always exhumed female corpses, inspected them—especially the genitals—, cut them up and apparently in one instance made a coitus-like play. The later the delict occurred, the longer had the women been dead and, accordingly, in a more progressed state of decomposition.

The necrophiliac was exculpated in court with the diagnosis schizophrenia which still may be clinically the correct one. He gave the author little insight into his history and inner life. Hence the author had to take recourse to his and preceding observations, to the Rorschach, and to a considerable amount of interpretation. There were a number of suicidal attempts and self-injuries as well as several escapes from the mental hospitals.

The author comes to the conclusion that amorphousness is the structurally essential element in his case. He endeavors to show the "impression of the amorphous" in the man's mimicry and gestures, in his manner of speaking, in his way of experiencing, in his life course, even in his attempts to escape from the hospitals. The amorphousness, in the author's opinion, is manifested also in incomplete distinction between inside and outside and in the sexual desire for the—increasing—amorphousness of dead bodies.

An interesting chapter on the literature of necrophilia, including belles letters is very carefully done. Remarks on the forensic adjudgment are briefly made. In the last chapter

the problem of necrophilia, *i.e.* of necrophilia in the broader and of necrophilia in the narrower sense, is discussed at some length.

The author has worked hard to get and to interpret the accessible material. One cannot help wondering when and how the cardinal point of amorphousness was taken into consideration. As the author has done his structural analysis with his own self-forged tool, there would not be much sense in discussing details which after all stand and fall with the acceptance of this tool. This reviewer would find such an acceptance easier if there were on one hand more reliable communications of the case available and if not—perhaps mainly due to this lack—the presentation were again and again rather forced. The merit to have published a case of necrophilia—not a monograph on necrophilia as the title of the treatise might make one assume—is despite these criticisms gladly conceded.

There are 3 Rorschach protocols—very helpful certainly—exemplarily directed and interpreted by Roland Kuhn.

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PSYCHIATRY AND THE PUBLIC HEALTH. By *G. R. Hargreaves.* (New York: Oxford Univ. Press, 1958. $3.00.)

The author has edited his lectures given to the "medical" public for the Health Clark Bequest. This bequest made possible lectureships on the history and progress of Preventive Medicine. Dr. Hargreaves is the first psychiatrist given this honor and his lectures completely justify his selection.

For one unfamiliar in the field of preventive psychiatry these lectures are a must. For those experienced in this field Dr. Hargreaves has brought his freshening insights into the field to help us understand why we are at all concerned about preventing mental illness. Dr. Hargreaves has chosen to start at the beginning and progress to modern times, where we find psychiatry at the threshold of preventing illness and its complications.

Anyone interested in mental illnesses, and physicians who are concerned about the extent of psychiatric disorders in their practices should find in this small volume considerable of interest. Psychiatrists in training would do well to read this book.

The best thing about it is Dr. Hargreave's explanation about how mental illnesses have become a major public health problem and what might be done about this fact.

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PATIENTS, PHYSICIANS AND ILLNESS. Edited by *E. Gartley Jaco.* (Glencoe, Ill.: The Free Press, 1958, pp. 600. $10.00.)

This volume is presented as a sourcebook of "behavioral science" in medicine. Most of the 64 contributors, including the editor, are "behavioral scientists," 11 have medical degrees and, of these, 4 are working in or associated with psychiatry. "To the individual who has ever been a patient, or the physician, nurse, medical scientist, or health technician, the contents and orientation of this volume may seem novel, if not unique. As an effort to bring together the writings, research and ideas of representatives of the behavioral sciences on varied aspects of medicine within a single cover, this sourcebook presents a view of medicine not well-known nor often recognized. Because medicine has traditionally had a biological orientation and basis, the entry of the sociologist, cultural anthropologist and social psychologist may seem a strange, if not bold, venture. Indeed, such a view may also feasibly be held by many social scientists. The patient, the physician, and illness itself, however, may be given newer significance and understanding when examined from the perspective of these disciplines becoming known as 'the behavioral sciences.'" This excerpt from the Introduction fairly reveals the general character and theme of the book. Of the 55 chapters the majority have appeared previously in social science, psychological, and similar publications, and at least one in the Journal of American Medical Association. (Be it noted that this volume does *not* include "Near Life, Near Death, Near God" as published anonymously and given editorial support in the J.A.M.A., 1957, **163**: 15, 1358. Nor does anything in the book approach the naiveté of that propaganda to which some medical schools had already succumbed.) The *good* physician, who, in spite of appearances, must always be acutely conscious of many other deficiencies than this book implies, will find little that is actually novel or unique in it. Indeed, some of the contributors point out that much of what they have to say is self-evident or well known and that some of their views need further evidence to support them. It is suggested that further courses in behavioral sciences should be included in the medical curriculum. But surely such material, if sufficiently established or worthy of investigation, is the type that the student should best learn —along with its limitations as well as the limitations of other material—from a *good* clinical instructor rather than from formal courses; the good clinical instructor *does*

recognize that much or most *dis-ease* is related to heredity and environment in its broadest sense—social milieu, cultural factors, mores, personal associations, circumstances, problems, *etc.* Better understanding of that relationship, as of all problems of medicine, without any exception, is, of course, urgently required but the discursiveness of this book—analysis of health, illness, patient, student, physician, nurse, hospital, community, *etc.*—would seem to militate against that objective rather than advance it.

About 50 pages are devoted to reference matter and bibliography combined and 8 pages to explanation of terms used in the behavioral sciences. There are not many but a few typographical, spelling or grammatical errors, such as cardiac "infection" for infarction, "prosecuted" for persecuted, "sited" for cited, each "have" for each has.

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The Psychology of Early Childhood. By *Catherine Landreth, Ph.D.* (New York: Alfred A. Knopf, 1958, $8.75 trade—$6.50 text.)

This book is a survey of present-day knowledge concerning the development of child behavior to the age of 6 years, written in a form which makes it suitable for use as an introductory college textbook on the subject. The author, who is Professor of Child Psychology and Director of the Institute of Child Welfare Nursery School of the University of California in Berkeley, has drawn upon her experience and perspective both as investigator and teacher in the field of child development to present in a clear and interesting way basic psychological concepts which are needed in the educational background of such professional disciplines as nursery school and kindergarten teaching, clinical psychology, family and child social welfare work, nursing, pediatrics, and child psychiatry.

Oriented toward the results of research, the text gives representative experimental data on which generalizations in child psychology have been made, drawing, to some extent, from the pediatric and psychiatric as well as, more extensively, from the psychological literature. Conclusions drawn are commonsense and, although areas for needed research are indicated, there is a minimum of theorizing and speculation to fill the many large gaps in current knowledge.

The subject matter is clearly outlined. Each chapter begins with a few questions designed to stimulate the student's selective interest and ends with a brief review of the salient conclusions. The text is well supplemented with figures (105), tables (17), and brief illustrative examples. At the end of each chapter, also, are a small number of carefully selected recommended readings, often some recommended films, and usually about 2 to 4 pages of references.

Beginning with a brief review of "The Origins of Child Psychology," the body of the material is organized under the following chapter headings: "Prenatal Origins of Behavior," "Behavior of the Newborn," "Motor Behavior," "The Development of Language and the Function of Speech in Early Childhood," "Emotional Behavior," "Social Behavior Toward Age Peers," "Perceptual and Adaptive Behavior," "Developmental Factors," "Learning Processes," "Mental Functioning," and "The Child's Interaction with his Environment." The book ends with a discussion of the "Problems Inherent in the Study of Human Behavior," mentioning the restrictions involved in the use of the experimental method in the study of human subjects, suggesting the kind of data that can be obtained on child development and behavior as a natural science, and indicating the immensity of the task ahead in the development of the field and the need for a multi-discipline approach.

Although the generalizations in child psychology contained in this book are applicable to the understanding and regulation of the development of the individual child, their use in the diagnosis, prognosis, and treatment of behavior disorders is outside of the scope of the material presented. The book is concerned, largely, with normal development rather than with clinical problems, although the "normal" includes a wide range of deviations. Psychoanalytically oriented child guidance personnel will find much of the theory on which their dynamic formulations and treatment are based either only briefly mentioned or, in some instances, rejected as unsupported by rigorously obtained statistical data. There has been no attempt in this book to fit the various aspects of child development into any one theory structure or into an integrated system of concepts.

It is the reviewer's opinion that not only will teachers and other professional workers responsible for the care of young children find this book a good introduction to the psychology of early child development and a useful reference resource, but also that nurses, medical students, and physicians who are not well grounded but are interested in the growing literature in the field will find it interesting

and profitable reading. The vocabulary and style are not at all formidably technical, but the scientific standards maintained in the selection of material in a relatively recent, complex, controversial, and burgeoning field of knowledge have been high.

HALE F. SHIRLEY, M.D.,
San Francisco, Calif.

THE PSYCHOLOGY OF MEDICAL PRACTICE. By *Marc H. Hollender, M.D.* (Philadelphia and London : W. B. Saunders Company, 1958, pp. 276.)

Contributions by a psychiatrist, an obstetrician, a pediatrician, and an internist are included in this monograph. There are two chapters on the doctor-patient relationship which unfortunately begin with a categorization of this relationship into 3 types ; and many physicians, only barely initiated dynamically, may not find the terms "activity-passivity," "guidance-cooperation," and "mutual participation" too meaningful. The author adds that there is no one particular type of relationship that is best, but the model chosen should be most appropriate to the given situation.

The second chapter on the practical aspects of this relationship between doctor and patient makes a number of points which bear close reading, such as : the need to understand the purpose, function, and the fears that provoke reactions to an illness, and how unserviceable the concept of "good" and "bad" is when applied to such reactions. Also covered are the shortcomings of a "normal" and an "abnormal" in evaluating behavior, and the error of too great stress on whether a pain is "real" or "unreal." In discussing the motivation of a patient's visit, the author points out that in many cases ". . . the 'real reason' will be revealed only as the patient gets to know you and is sure your attitude is sympathetic."

The section dealing with the cancer patient stresses the need to individualize one's approach to the patient, and the benefit of being told the diagnosis by a physician known to the patient rather than by a comparative stranger. A quotation from an article by C. S. Cameron on the management of the terminal patient certainly merits attention.

Several discussions in the chapter on obstetrics (by E. M. Solomon, M.D.) make excellent and informative reading for psychiatrists, for instance : "Clinical experience amply attests to Reynold's statement that women do not necessarily like to be pregnant and often deeply resent pregnancy" but adjust to it as the condition continues ; and the patient not infrequently tells the obstetrician she is opposed to breast feeding, and a strong aversion or revulsion against the process may exist. The approach to natural childbirth and keeping the baby with the mother continuously after the first 24 hours are refreshingly practical, since it is pointed out that both approaches are excellent for some patients but not indicated for others.

The section on pediatrics (by J. B. Richmond, M.D.) is equally well written. The value to the physician of seeing the family in a more spontaneous situation during a house call, the value of listening, and a thorough examination in relieving anxiety, and the need to avoid glib reassurance are stressed. He points out that troublesome areas may not be mentioned and that the mother's real feelings may not be in keeping with what is at first expressed. Finally, the problems faced by a parent whose child has a malignancy are described and realistic suggestions are offered.

There is also a chapter on the medical patient, in which coronary heart disease, diabetes mellitus, and cerebrovascular accidents are considered.

The careful reading of this material would certainly aid one in understanding the patient's emotional difficulties. There are also some practical and understandable suggestions on approaching the patient which would be of great value to the non-psychiatric physician.

JACKSON A. SMITH, M.D.,
University of Nebraska,
Omaha, Nebr.

THE FEMALE OFFENDER. By *Prof. Caesar Lombroso* and *William Ferrero.* (New York : Philosophical Library, Inc., 1958, pp. 313. $4.75.)

Caesar Lombroso, one of the greats of 19th century psychiatry and psychology, directed much attention to the study of the criminally deranged. However, viewed in light of 20th century understanding, some of his concepts in *The Female Offender* are most inadequate. These include such items as the born criminal, atavism and physiological anomalies, to mention only a few. Nevertheless, Lombroso's speculations found him pleading for a clearer differentiation between the casual and the habitual offender. He also helped inspire a more careful scrutiny of statistics in crime.

Dr. Pirone in the Introduction has written as follows : The present study in criminal biology, which grew out of his collaboration with William Ferrero (although almost a hundred years ago) should be particularly welcome to counterbalance the mainly ana-

lytical and psychologically dynamic hypotheses of today.

This reviewer believes such "counterbalancing" is primarily of value in terms of historical perspective and does not scientifically negate "analytical and psychologically dynamic hypotheses of today." Keeping this in mind, *The Female Offender* is a worthwhile addition to all social science libraries.

ARTHUR LERNER, PH.D.,
Los Angeles City College

ELECTRONIC INSTRUMENTATION FOR THE BEHAVIORAL SCIENCES. By *C. C. Brown, Ph.D.* and *R. T. Saucer, Ph.D.* (Springfield : C. C Thomas, 1958. $5.50.)

A product of psychophysiologic experience, this small volume is a clearly written digest of an elimentary course in electrical theory and application. It is addressed to the sophisticated amateur. The text includes simplified explanations of recent technical advances as transducers and transistors, as well as circuits for basic instrumentation. Diagrams, appendices, and table of contents are satisfactory. A helpful guide in the initial development of an electronic-behavioral laboratory.

MAX FINK, M.D.,
Glen Oaks, L. I., N. Y.

PSYCHOTHERAPY OF CHRONIC SCHIZOPHRENIC PATIENTS. Edited by *Carl A. Whitaker.* (Boston : Little, Brown and Co., 1958, pp. 219. $5.00.)

The prospect of reviewing a 3-day conference, which often extended into the wee hours of the morning, might in itself be overwhelming if it were not for the inherent promise of help and encouragement in the treatment of chronic schizophrenics. The report of the conference of October 1957 is made up of a review of the 8 sessions and a summary. Each session is moderated by one of the participants. The most unusual feature of the book is its informality. Eight experts in the field of psychotherapy, 7 of whom were practicing psychiatrists and one an anthropologist, were encouraged to discuss in a matter-of-fact way their views on this subject. The interchange was recorded and later reviewed by each contributor, so that spontaneity is preserved.

The first chapter, Diagnosis and Prognosis, moderated by Malcolm L. Hayward of Philadelphia, begins with the happy approach of using treatability as an operational diagnosis. Though Hayward is worried lest the reader find this chapter confused and disorganized, the sophisticated student will have more of a feeling of amused toleration and a realization that others, like himself, are overwhelmed by the complexities of this disease. On the basis of the abilities of the therapist, at least a grouping of schizophrenia is deemed possible.

The next chapter, Schizophrenic Distortions of Communication, moderated by Gregory Bateson, is a record of a lively interchange on the patterning of schizophrenia. It ends with a delightful illustration of the schizophrenic mother and her effect upon others in her environment. It also points up the argument about whether schizophrenia is an illness or a learned way of functioning. The mother had more of an effect on the narrator of the story than he realized.

In the chapter on Orality, moderated by Carl Whitaker, the group is unable to define oral deprivation. In any case, Whitaker believes that schizophrenia is more complex than oral deprivation. He postulates 3 possible factors in the etiology of this disease : (a) deprivation of closeness ; (b) a noxious ingredient ; (c) a lack of remedial life experience. All participants agree that the therapeutic processes involved do not lend themselves to "simple technical rules."

Anality is moderated by John Warkentin, who opens with the psychotherapeutic truism that "replacement therapy" is not enough. Also, that both in the etiology and treatment of schizophrenia major factors become operative after the oral period of psychosexual development. In this section the preoccupation with the schizophrenogenic mother is abandoned. The aspects of anality-control, guilt and aggression raise the image of the father. Warkentin says that it is all right to let the patient "win" when the therapist is paternal, but that he should not be allowed to win when the therapist is "maternal." Allowing the patient to win when the therapist is maternal may even increase the risk of suicide. Does indifference in the therapist express accumulated deep anger and isn't it expressed exactly the same way as indifference in the schizophrenic patient ? The etiology of schizophrenia then does not only depend on the failure of feeding by the mother, but also on the failure of the father to assume his masculine control. The therapist must first establish a firm masculine contact to overcome the patient's stubbornness. The patient then regresses to an oral level where he can accept the therapist's maternal function. There are advantages of multiple therapy and group therapy in this connection. Also, flatness and indifference on the part of either the patient or the therapist represents an impasse in treatment.

Family and Sexuality is moderated by Don Jackson. Malone makes a statement that the amount of milk varies with the extent and openness with which the male expresses his love for the female which, if substantiated, would be the real proof that the father plays a leading role in the production of schizophrenia. All agree that the success of therapy of schizophrenia usually requires that the therapist be family-oriented rather than patient-oriented. If the patient is living with his parents, it usually will be necessary to include them in some form of psychotherapy.

Counter-transference is moderated by Thomas P. Malone. "The kind of person who psychologically treats schizophrenia is apt to be the kind of person who has available the kind of feelings that are apt to make the patient accept these feelings as being true; second, the intensity of the patient's need for such feelings and juxtaposition of these two things creates the phenomenon." Growth, or possibly a change in the personality of the therapist, occurs in the treatment of schizophrenic patients. The therapist tends to grow in areas parallel to those in which the patient grows.

The chapter on Management of the Patient is moderated by John N. Rosen. He is opposed to hospital treatment "currently" because they cannot offer the patients the enormous amount of individual therapy they require. Also, in hospitals there are antagonisms, hostilities and jealousies that make friction and intolerance. This interferes with the individual attention to the patient.

Family Management is moderated by Edward Taylor, who points out that all mental illness develops in a family and is present in several members of the family. The participants agree that to treat a psychotic patient one must also treat his reactions to members of his family and forces within the family that produce the psychosis. The corrective forces that they recommend are as follows: 1. Provide maximum freedom for the patient, psychologically. 2. Provide maximum security for his physical care. 3. Provide maximum honesty and predictability in the patient's treatment world, that is, protecting him from counter-transference with people working around him which might make him feel confused and betrayed in this world.

The emotional climate of tolerance, which is so necessary for the patient to be able to experience his own anxiety and anger, is well illustrated by these sessions where 6 of our colleagues met in mutual tolerance and frankness. While some may be puzzled by this approach, it was very helpful to me. It stimulated my therapeutic efforts in both individual and group treatment. It has been an aid in teaching and supervision. Congratulations to the editor and his co-authors!

DONALD A. SHASKAN, M.D.,
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ECONOMICS OF MENTAL ILLNESS. By *Rashi Fein, Ph.D.* (New York: Basic Books, Inc., 1958, pp. 164. $3.00.)

This is the second report of the Joint Commission on Mental Illness and Health. In it Dr. Fein, an economist, estimates as accurately as available data allow, the total annual cost of mental illness in the United States. The total cost is calculated by the addition of two factors, the *direct* and *indirect* costs. The direct costs are the actual public and private expenditures for the care of the mentally ill plus the cost of scientific research in this field. The indirect costs include the hidden expenses of mental illness, the lost production, lost income, and loss of future earnings.

Unfortunately the validity and pertinence of the data used in this task vary enormously. No one "typical" year can be selected because important data are not equally available for every year. Hence information is culled from sources ranging in dates from 1949 to 1957. During even this relatively short span it is certain that costs of care have gone up and that prognostic outlook for patients under treatment has changed. Inevitably too, in arriving at the best guess of total costs certain very accurate and precise figures must be added to those for which the accuracy is very doubtful.

In spite of these difficulties, which of course are freely admitted, Dr. Fein is able to estimate that as a basic minimum, the United States is spending 1.7 billion dollars a year in direct costs and .7 billion in indirect costs. And this does not include the cost of treatment of mentally ill patients by general practitioners and internists. If this and certain other omitted categories were included the total estimate would certainly amount to more than 3 billion a year.

The value of this study lies in the clear analysis of the methods of computing from inadequate data a figure which has some significance relative to other major public and private expenditures—education for example, or alcoholic beverages. Dr. Fein points out that in the last analysis the public must decide what it will spend money on. Obviously it cannot afford to buy everything it wants. The decision as to whether a large part of the national income will be spent on mental ill-

ness and health or on alcohol or motor cars is a matter of public values. The nation can afford to spend more on mental illness if it spends less on something else. The investment of more money in direct costs may reduce the indirect costs to the point where the total bill is reduced.

Suggestions as to what should be done in order to make an accurate accounting of the costs of mental illness possible are included in the study.

For those interested in the statistical dimensions of mental illness, this is an excellent report and a valuable reference.

J. D. GRIFFIN, M.D.,
General Director,
Canadian Mental Health Association.

A TEXTBOOK IN RORSCHACH TEST DIAGNOSIS. By *Ewald Bohm, Ph.D.* Translated by *Anne G. Beck, M.A.* and *Samuel J. Beck, Ph.D.* (New York : Grune and Stratton, 1958, pp. 322, $7.75.)

Doctor Bohm, a keen exponent of the Rorschach as a clinical tool, gives us a complete description of present European principles and practices as regards this instrument.

Students will welcome the reformulation of principles of personality vital toward understanding the rationale of the Rorschach. This is done with regard to types of personality in relation to clinical pictures. There is also a refreshing exposition on the meaning of separate variables, more fully than this reviewer has hitherto seen in the English literature.

The Becks have done an excellent job in translating this volume from the German. Readers will also profit from the various interpretative leads, points of departure for research and coverage of the literature.

ARTHUR LERNER, PH.D.,
Psychology Department,
Los Angeles City College.

HEREDITY COUNSELING. Edited by *Helen G. Hammons.* (New York : Paul B. Hoeber, Inc., 1959, pp. 112. $4.00)

In the whole of the United States there are only about 20 institutions to which the individual in search of genetic counseling can go for advice. The truth is that everyone contemplating marriage and the raising of a family requires some help in resolving questions of heriditary transmission, for human beings are the carriers of many deleterious genes, and the "normal" fitness of a population is simply, as Dobzhansky and Wallace have pointed out, an average expression of a multitude of genotypes all riddled with deleterious recessive genes.

If the fitness of human beings is to be improved, some attention should be given to the problems which are likely to arise in a system characterized by random mating such as ours. Philosophers are not yet kings, and even geneticists don't know a large number of the answers to the questions they are asked, but one thing is certain, and that is, that many tragedies could have been avoided for countless numbers of human beings, had heredity counseling been available to them.

In the present small volume, 17 experts with experience in heredity counseling pool their knowledge, and underscore the importance of an area of theory and practice which sorely needs development. The volume, which is issued under the auspices of the American Eugenics Society, contains several original contributions, in addition to the more general discussion of the structure and functions of a heredity counseling service.

ASHLEY MONTAGU, PH.D.,
Princeton, N. J.

CLINICAL NEUROANATOMY, NEUROPHYSIOLOGY AND NEUROLOGY. With a Method of Brain Reconstruction. By *Louis Hausman.* (Springfield, Ill. : Charles C Thomas, 1958. $9.75.)

This work represents a concise, integrated and comprehensive approach to clinical neuroanatomy, neurophysiology and neurology. Based upon amplification of the method of teaching originally described by Adolf Meyer, it combines the study and simultaneous reconstruction of a three dimensional model of the nervous system. The text is illustrated by plates and tables and is to be employed in conjunction with the author's Atlases 1 and 2 published by Charles C Thomas. The material presented has been used for many years at Cornell University Medical College and New York University Medical College. The author's efforts to integrate basic science with clinical application have been successful. The type is clear, the style lucid and the presentation logical. This book should be useful to teachers and students of neurology, neuroanatomy, and neurophysiology.

JOHN B. DOYLE, M.D.,
Los Angeles, Calif.

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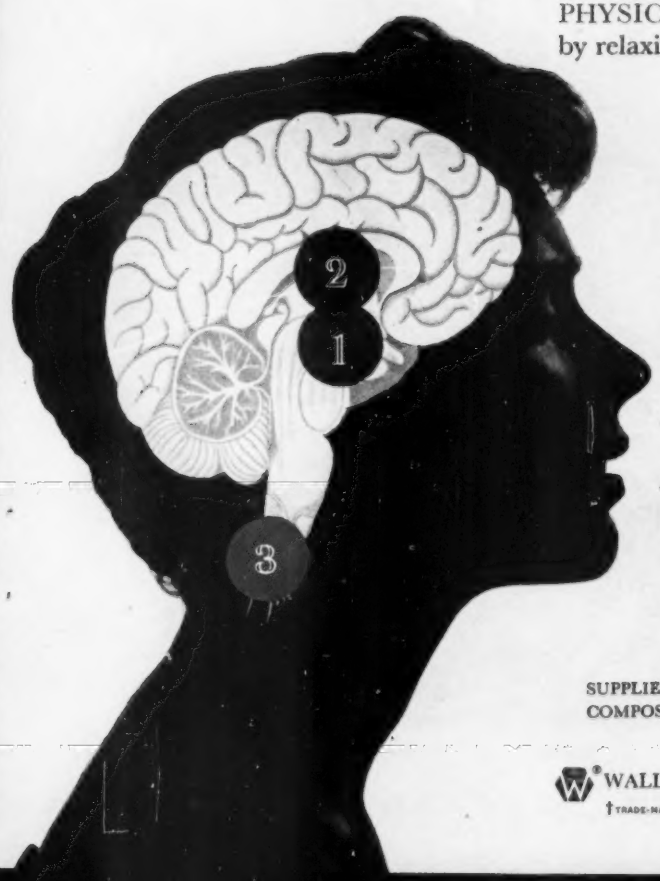

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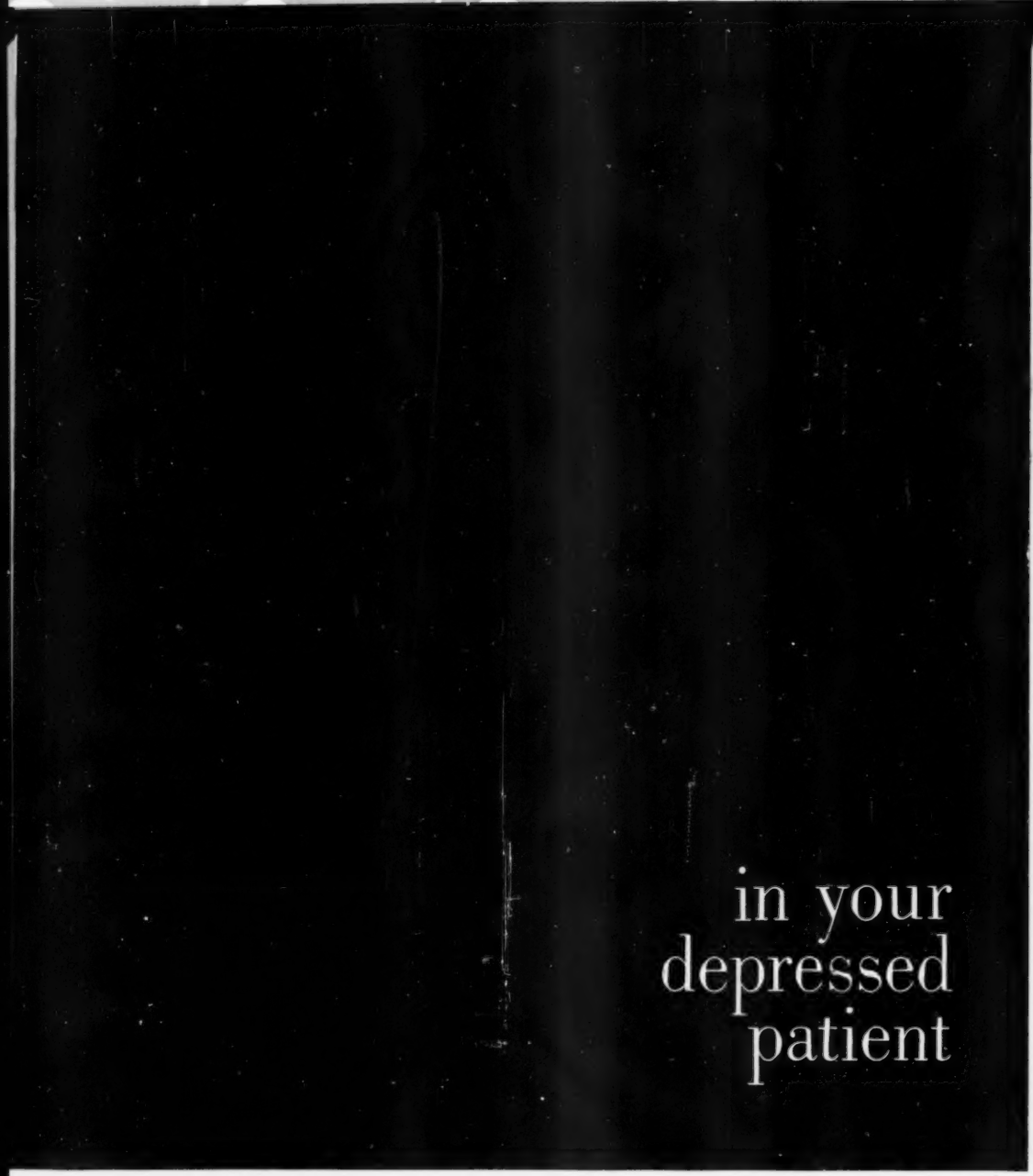

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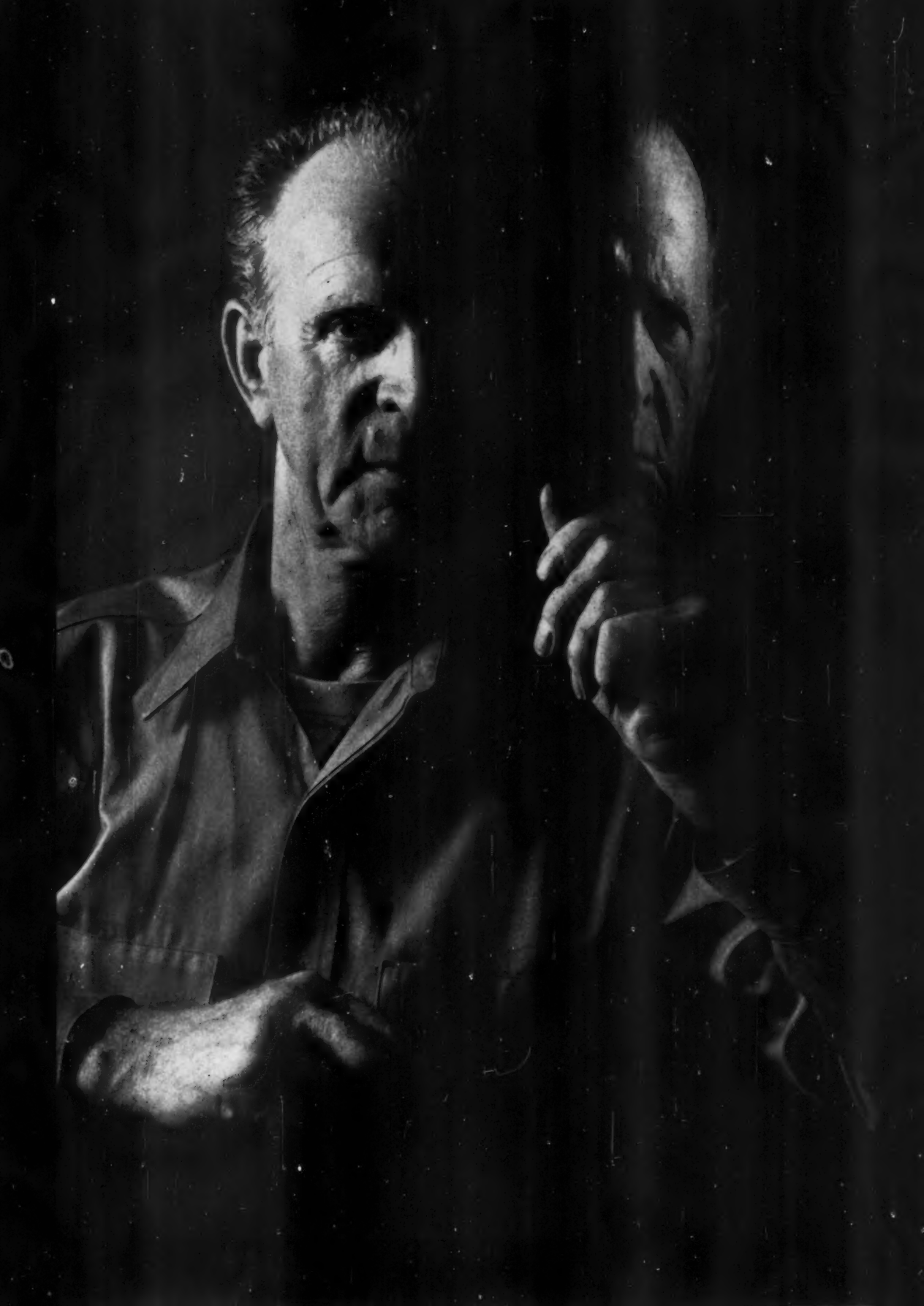

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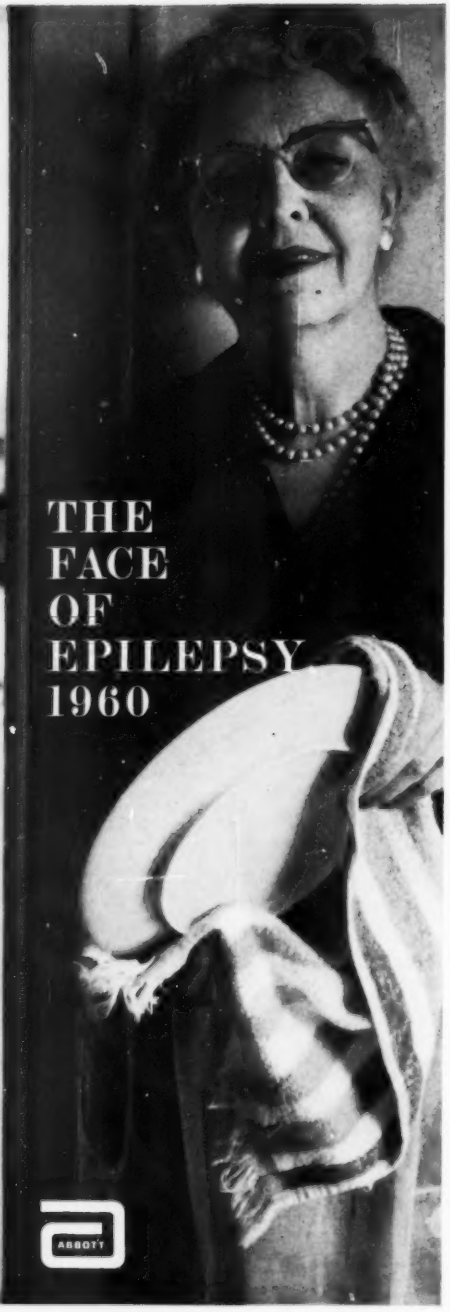

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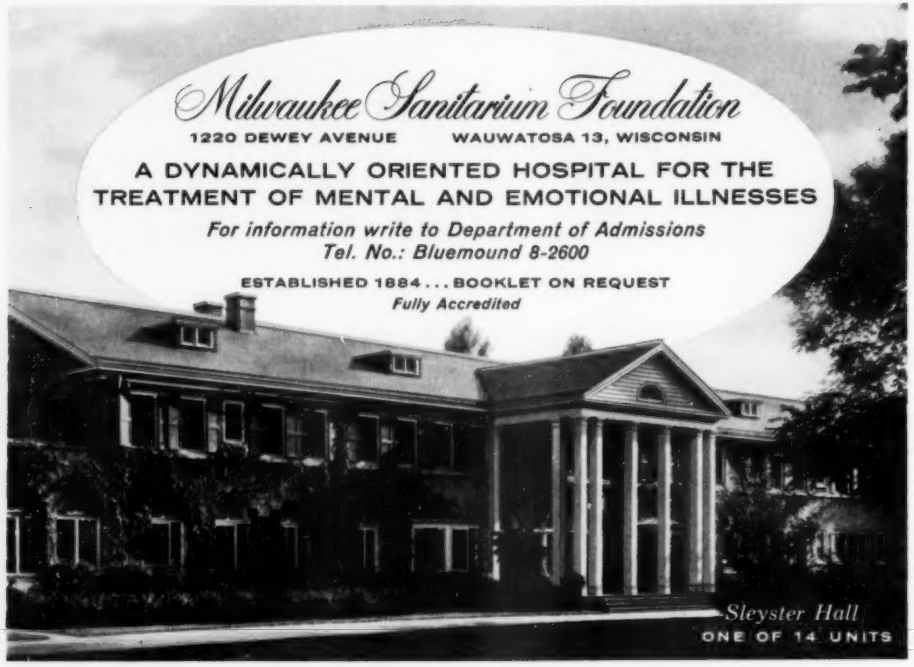
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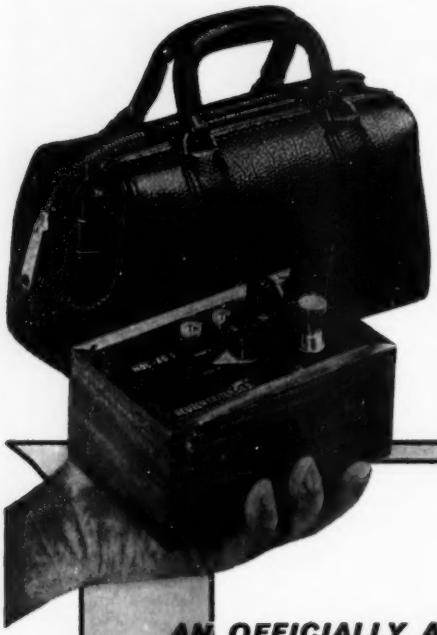

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